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ABSTRACT

Studies of urban student performance in mathematics and science are reviewed in order to identify factors and processes that might improve student achievement. The first part of this review describes the urban context for education reform, beginning with a description of the demographic characteristics of urban students. The resource context is reviewed as it has been studied, considering community and family conditions, the availability and flow of teachers, the financial resources of urban school districts, and special programs for educationally disadvantaged students. The second part of the review describes systemic reform efforts from an urban perspective and examines literature related to current reforms and merging effective strategies for teaching inner-city youth. A final section presents conclusions based on the review. The review makes it evident that in implementing standards- based systemic reform, urban school systems face greater challenges than do other school systems. With a majority of students from disadvantaged backgrounds and fewer resources with which to implement change, urban schools are in a double bind. For urban students to achieve at high levels, their schools must be better than those in other communities. The reform of teaching and learning approaches holds the most promise for bringing about reform. An appendix contains tables of city, school district, and reform effort data. (Contains 4 tables and 336 references.) (SLD)

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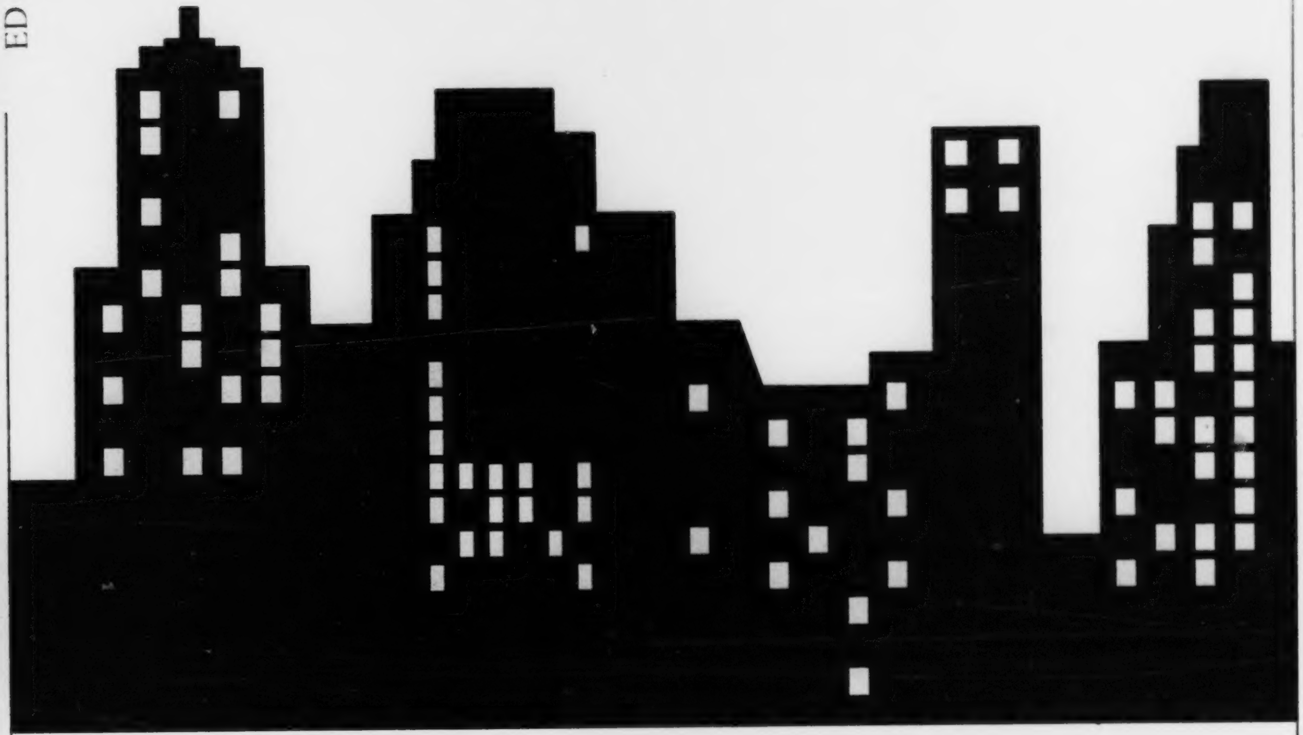
Literature Review. Background for the Evaluation Design of Urban Systemic Intiatives (USI) Program

Systemic Reform in Mathematics and Science Education: An Urban Perspective

ED 403 346



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SYSTEMIC REFORM IN MATHEMATICS AND SCIENCE EDUCATION: AN URBAN PERSPECTIVE

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SYSTEMIC REFORM IN MATHEMATICS AND SCIENCE EDUCATION: AN URBAN PERSPECTIVE

A "different educational world" is the way analysts who have compared urban schools with schools in other settings, describe urban education (Hannaway & Talbert, 1993; Witte & Walsh, 1990). This review attempts to describe this world by examining studies of student performance in urban schools and conditions likely to contribute to that performance. Our central purpose is to identify factors and processes that may facilitate or impede effective systemic reform, particularly reform in math and science education, in these settings.

The review has three major parts. In the first part, we describe the urban context of education reform. We begin by describing the student context - the demographic characteristics of urban students and indicators of their academic performance. We then discuss the resource context: community and family conditions in urban America, the availability and flow of qualified teachers, the financial resources of urban districts, and special programs that supplement the work of urban schools with educationally disadvantaged[1] students. The second part of this review describes systemic reform efforts from an urban perspective and examines literature related to current reforms and emerging effective strategies for teaching inner-city youth. In the final section, we present conclusions based on our review of the literature and discuss the implications of research to date on reform in mathematics and science in urban schools.

EDUCATION IN THE URBAN CONTEXT

The Student Context

Student Demographics

Inner-city students make up roughly one-third of the total population of elementary and secondary students attending public schools in the United States. According to the National Center for Education Statistics (NCES), 30.3 percent of public elementary and secondary students in the United States are enrolled in schools that are within the central city of a metropolitan statistical area (MSA); 13 percent are in large metropolitan settings with populations over 400,000 (United States Department of Education [ED], NCES, 1994).

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[1] This review adopts a definition of educational disadvantage developed by Natriello, McDill, and Pallas (1991). *Educational disadvantage* is the result of insufficient educational experiences in at least one of the following domains: formal schooling, family, and/or community. This disadvantage can result from cultural differences that make experiences in the family or the community incompatible with those in public schools, or economic limitations that leave families without sufficient resources beyond those necessary for survival.

Urban students are overwhelmingly minorities -- racially and linguistically -- and economically disadvantaged. A recent survey conducted by the Council of Great City Schools found that the forty-seven school districts it represents serve 36 percent of African-American students, 30 percent of Hispanic students, 21 percent of Asian/Pacific Islander students, and 7 percent of Alaskan/Native American students in the country, but only 4.7 percent of White students (Council of Great City Schools, 1994). Data collected by the NCES present a similar picture: since 1981, African-American and Hispanic students have made up a majority of students in central cities. Nationally, African-American students make up 16.7 percent of the elementary and secondary student population in the country, but 32.9 percent of the central city student population. Similarly, Hispanic students account for 11.9 percent of U.S. students, but 21.6 percent of central city students (ED, NCES, 1995). While the percentage of African-American students in central cities has been fairly steady for more than twenty years, the percentage of Hispanic students has more than doubled (ED, NCES, 1995). The increase in Hispanic students, due largely to immigration, poses difficult language challenges for urban schools, as we discuss later.

Student Performance

The student performance news is both good and bad. First, the good news. The average mathematics and science proficiency, as measured by the National Assessment of Educational Progress (NAEP), of students of all age groups (9, 13, and 17 year-olds) in the United States showed increases from 1982 to 1992 equivalent to roughly between a year or two of high school (ED, NCES, 1995).

NAEP allows us to compare differences in performance by racial group and, to some extent, by community type. We discuss performance differences first by race then by community. Since central city schools serve largely minority students, measures by race, while imperfect as a gauge of performance in urban areas, give us some indication of academic performance in cities. Here, too, the news is good: gains for minority students exceeded gains for White students between 1982 and 1992 causing the achievement gap between White and minority students to decrease over this period (ED, NCES, 1994; ED, NCES, 1995; Grissmer, Kirby, Berends, & Williamson, 1994).

Changes in the course taking behavior of students during the last decade parallel changes in overall achievement levels as well as in performance differences across student groups. This is not surprising since numerous studies show that students who take more math and science course work perform better on standardized achievement tests (Gamoran, 1987; Hoffer, Rasinski, & Moore, 1995; Jones, Mullis, Raizen, Weiss, & Weston, 1992; Rock & Pollack, 1995). It is encouraging that White, African-American, and Hispanic students showed similar percentage increases (12%, 13%, and 11%, respectively) in taking upper levels of mathematics (Algebra II, Pre-calculus, Calculus) between 1986 and 1992. White students continued in 1992, however, to take higher level math at higher rates than African-American or Hispanic students -- 57 percent, 45 percent, and 37 percent, respectively (Mullis et al., 1994). In science, the percentage of students taking biology increased between 1986 and 1992 for all students (88% to 92%), with African-American students showing the largest increase (84% to 92%). Hispanic students also showed increases, although somewhat lower (84% to 87%). Differences between White and minority students were greater for chemistry. While all groups again showed increases from 1986, 52 percent of White students took chemistry in 1992; only 36 percent of African-American and Hispanic students did. A relatively small and stable percent (13-14%) of all three groups took physics (Mullis et al.,1994).

The news, however, is not all good. U. S. students still lag behind their counterparts in international comparisons, particularly in mathematics (ED, NCES, 1995). And despite gains by minority students, performance disparities between White and minority students remain large. They are especially large when the advanced skills and knowledge expected to be important for the jobs of tomorrow are measured (Lindquist, Dossey, & Mullis, 1995). Hispanic 13 year-olds, for example, score at about the same level in science as White 9 year-olds, and the performance difference between White and African-American students is about the same. The math skills of minority students appear to be about two years behind. Particularly disturbing are the latest NAEP results, which suggest that minority gains may be leveling off, so that the gap between minority and White achievement may no longer be narrowing (ED, NCES, 1995). In addition, course taking trends since 1982 show that later year gains - since 1987 - were smaller than those in the early eighties, suggesting that increases in upper level course taking may also be starting to level off (Coley, 1994).

The NAEP 1992 Mathematics Report Card for the Nation and the States (Mullis, Dossey, Owen, & Phillips, 1993) and *The 1990 Science Report Card* (Jones et al., 1992) also report results by community type: advantaged urban, disadvantaged urban, and extreme rural.[2] Each of these groups represents approximately the most extreme 10 percent of the student population in each type; the remaining 70 percent represent "other" students. Performance differences among these groups are dramatic, though not unexpected, since the definitions were specified to capture extremes. *The Mathematics Report Card* establishes three achievement levels: advanced, proficient, and basic, and reports the percentage of students achieving at each of these levels, along with the percentage whose achievement levels were "below basic" (Mullis et al., 1993). In 1992, the percentage of *advantaged urban* students achieving at, or above, each of these levels was as follows: 7 percent (advanced); 36 percent (proficient); 81 percent (basic). For *disadvantaged urban* students, the results were: 0 percent (advanced); 3 percent (proficient); 27 percent (basic). Nineteen percent of the *advantaged urban* students scored "below basic" compared to 73 percent of disadvantaged urban students. These differences are disturbing, but even more disturbing is that between 1990 and 1992 the *disadvantaged urban* students were the only group whose mathematics performance significantly declined (Mullis et al., 1993).

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[2] The three extreme community types were defined as follows: 1)*Advantaged Urban*- Students reside in metropolitan statistical areas and attend schools where a high proportion of students' parents are in professional or managerial positions; 2)*Disadvantaged Urban*- Students reside in metropolitan statistical areas and attend schools where a high proportion of students' parents are on welfare or are not regularly employed; 3) *Extreme Rural*-Students do not reside in metropolitan statistical area and attend school in areas with a population below 10,000 where many students' parents are farmers or farm workers.

The *Science Report Card* also reports results for community type by four proficiency levels: Level 200 (Understands simple scientific principles); Level 250 (Applies general scientific information); Level 300 (Analyzes scientific procedures and data); and Level 350 (Integrates specialized scientific information). Here, too, there were large discrepancies between the performance of *disadvantaged urban* students and other students. For example, 82 percent of *advantaged urban* students scored at the 250 level; only 43 percent of the *disadvantaged urban* students did so. And while more than a third of the *advantaged urban* students reached the 300 level, only 8 percent of the *disadvantaged urban* students reached it (Jones et al., 1992).

A review of evidence on student performance relevant to urban schools suggests two things. First, there is a long way to go. Large disparities between racial groups and between advantaged students and disadvantaged students remain in the United States. Differences between the most advantaged and the most disadvantaged are dramatic and distressing. Suggestions in the data that the gains of minority students may be leveling off, and that performance for the most disadvantaged students may actually be going down, should put us on alert.

Second, on a more optimistic note, the evidence also shows that progress is possible. Over the last decade or so, the gaps in performance among student groups in the United States has decreased due to more rapid increases by those at the bottom. This good news is often lost, but it suggests that further gains can be gotten with focused effort, particularly efforts that encourage more upper level course taking by students. In the next section, we examine what resources can be brought to bear in urban areas for efforts to improve math and science learning.

The Resource Context

In this section, we review available literature relevant to the capacity of urban school districts to deliver educational services effectively and efficiently. What resources are available for this effort? There are five areas discussed. The first area focuses on family and community factors. The second considers the most important in-school resource -- teachers. This is followed by a discussion of financial resources. We then consider special programs, including federally funded programs that operate in urban districts, as well as emerging reform networks. Finally, we look at special education programs. We are interested here in the extent to which resources in each of these areas are likely to constrain or facilitate systemic reform efforts in math and science in urban school districts relative to other types of districts.

Family and Community

For decades we have known that family and community background characteristics of students have a large and significant, indeed many argue dominant, effect on tested student academic performance. A recent analysis of the National Educational Longitudinal Study of 1988 (NELS:88) and the National Longitudinal Study of Youth (NLSY) showed, for example, that a child whose mother or father graduated from college scores, on average, a full standard deviation higher in mathematics than a child whose mother or father did not graduate from high school. Even with controls added for other factors (family income, family structure, race), the child with college-educated parents scores 0.5 standard deviation higher on standardized tests (Grissmer et al., 1994). In this section, we rely heavily on census data, NCES data on USI school districts, as well as reports from the Council of Great City Schools to describe family and community conditions in USI cities. We attend to factors that are known to affect student achievement, particularly parent education, family income, and whether English is spoken at home. We also examine general indicators of social and economic well being in urban areas. (See Tables 1 - 3 in Appendix A.)

Census data provide information on poverty rates and education levels in USI cities. They indicate that from 20 to 46 percent of children under age 18 are living below the poverty level in the 16 USI cities, compared with a national average of 17.9 percent (U.S. Bureau of the Census, 1994). Each of the 16 USI cities has a poverty rate greater than the U.S. average of 13.1 percent, and all but five cities have higher unemployment rates as well. The median household income in every city except Los Angeles falls short of the national median. The percentage of students eligible for free school lunch ranges from 44 percent to 75.7 percent. Of the USI cities, only Phoenix has a larger proportion of high school graduates than the national average. Ten of the USI cities have a lower percentage of the population with college degrees than the national average of 20.3 percent. Indeed, some are substantially lower, notably Cleveland with 8.1 percent and Detroit with 9.6 percent.

The cultural and language diversity of families living in USI cities also presents significant educational challenges for USI districts. Over half of the USI cities have foreign-born populations greater than the national average of 7.9 percent, with some cities dramatically higher. Miami, for example, has a foreign born population of 59.7 percent; Los Angeles is 38.4 percent, and New York is 28.4 percent. As expected, the percentage of the population speaking a language other than English at home is also far above the national average for a number of these cities -- Miami has 73.3 percent, El Paso has 66.7 percent, Los Angeles has 49.9 percent, and New York has 41 percent. (See Table 3 in Appendix A.)

The general economic and social conditions in cities are often dismal, particularly for minority youth. Urban youth, for example, face much more stark employment possibilities than their counterparts in non-urban communities. While the national average unemployment rate for youth aged 16 to 19 in 1992 was 19.0 percent, average unemployment for urban youth was 28.8 percent (Council of Great City Schools, 1994). These disparities are even more pronounced along racial lines, with urban youth unemployment rates in 1992 ranging from 21.3 percent for Caucasian youth, to 29.3 percent for Hispanic youth and 43 percent for African-American youth (Council of Great City Schools, 1994).

These severe economic conditions are accompanied by equally dire social conditions. Reported crime rates far exceed the national average in each of the USI cities for which data are available. (See Table 2.) Health conditions are also generally worse in urban areas than non-urban areas, as demonstrated by higher infant mortality rates, lower access to adequate health care for individuals in urban areas, and an AIDS rate five times greater than the rate in non-urban communities (Council of Great City Schools, 1994).

The social, economic, and family background characteristics of urban students mean that, in order for urban students to achieve at high levels, the schools have to be better than schools in other communities. It should be clear that urban schools generally cannot rely on family, peer, and community contributions to student academic performance that are available in more advantaged areas.

Teachers

Teachers represent the most important in-school resource in urban schools. This section will highlight who urban teachers are, what their qualifications are, and what they think about their work environments. First, the section reviews national and urban demographic trends in teaching. The discussion then turns to teacher supply and demand and teacher quality, with special emphasis on the preparation of math and science teachers, and efforts to increase teacher professionalization. National statistics are provided in addition to urban statistics to set the context for the urban teaching force. The working conditions of urban teachers and a general overview of teacher expectations, particularly of minority students, are then described. The section ends with a description of students in the teacher education pipeline and a discussion of their relevance to the urban student population.

Demographic trends. According to data collected by NCES, there are slightly more than 2.5 million public school teachers in the United States (ED, NCES, 1993). The vast majority of these teachers are White (87%) and female (73%). The average teacher is 42 years old and earned an average salary of $36,495 (ED, NCES, 1993). Ninety-nine percent of the teachers hold at least a B.A. or B.S. degree, with 53 percent having earned advanced degrees in their chosen fields. Most public school teachers hold regular or advanced certification in their main assignment fields (ED, NCES, 1993).

Of the 2.5 million public school teachers, 665, 565 (27%) taught in urban schools in 1992. Seventy-three percent of urban teachers are female; 27 percent are male (ED, NCES, 1993). Their average age is 42 and their average salary in 1992-93 was $39,319 (Council of Great City Schools, 1994). Ninety-seven percent of urban teachers hold at least a bachelor's degree and 58 percent hold master's degrees. Ninety-five percent are certified to teach in their chosen fields (Ingersoll, Han, & Bobbitt, 1995).

The demographic characteristics of teachers, who work in urban areas, do not differ substantially from national averages: Seventy-five percent of urban teachers are White and 25 percent are minority (ED, NCES, 1995). Sixteen percent of urban teachers are African-American, 7 percent Hispanic, and 2 percent Asian-American. But their characteristics are strikingly different from their students, over half of whom are from minority backgrounds.

Teacher supply and demand. During the 1970s and early 1980s, a serious decline in the supply of adequately prepared teachers emerged. According to data collected by NCES, between 1972 and 1985 the number of students graduating with a major in education decreased by 50 percent, falling from 194,229 in 1972 to 88,161 in 1982 (Darling-Hammond & Hudson, 1990). By 1988, only 9 percent of the bachelor's degrees conferred were in teacher education, reflecting a 48 percent decrease since 1972 (American Association of Colleges for Teacher Education [AACTE], 1990). The decrease in the number of students majoring in mathematics and science education was particularly severe. While 2,217 students earned degrees in mathematics education in 1971, only 629 did so eleven years later. Similarly, while 891 students earned degrees in science education in 1971, only 558 did so in 1982 (Darling-Hammond, 1990).

The supply of teachers fell as the demand for teachers heightened. Starting in 1984, the student population began increasing, particularly in minority communities (AACTE, 1988). Between 1984 and 2001 an 8 percent increase in the total public elementary and secondary enrollment is projected (AACTE, 1994). According to AACTE data, 200,000 new teachers will be required each year through 2001 to handle the increased student population and normal teacher turnover. NCES data for 1990-91 school year show schools are feeling the pinch; fifteen percent of all schools, and twenty-three percent of schools in central cities, reported having vacancies which could not be filled with qualified teachers. Schools with 20 percent or more minority students are finding it particularly difficulty to fill vacancies in special education, mathematics, and life sciences in addition to the general elementary field (ED, NCES, 1993). The Council of Great City Schools (1992) reports that more positions in math and science are left vacant in urban areas than other settings because of recruiting difficulties.

Unable to find qualified applicants, school administrators use a variety of strategies to fill vacancies. Most prevalent is the use of substitute teachers. Schools also hire less qualified teachers, shift existing staff to assignments in areas of need, and increase class size to compensate for the unfilled positions (ED, NCES, 1993). As a result of these practices, the quality of the teaching force has been compromised at precisely the time when higher standards of student performance are being demanded.

Teacher quality. The lack of well-qualified teachers led researchers in the early 1990s to shift focus from issues of simple supply and demand to issues of teacher qualifications (Goodlad, 1984; Ingersoll et al., 1995). Using the possession of at least a college minor in a field of study as a measure of qualification to teach that subject, it was found that increasing numbers of secondary school teachers are teaching out-of-field; that is, they are teaching subjects which their training does not qualify them to teach. Data reveal that public school teachers taught 15 percent of their course assignments in out-of-field subjects (ED, NCES, 1993). A *High School and Beyond* survey of 10,000 teachers found that 17 percent of public school teachers have less than a college minor in their primary fields, and the National Science Teachers Association (NSTA) survey of school principals found that 50 percent of the newly hired science teachers in 1989 were not certified to teach in assigned fields (Darling-Hammond & Hudson, 1990).

The situation is urban schools appears to be worse. Minorities, newly hired teachers, teachers in public schools serving high percentages of minority students, and teachers in public schools with high percentage of poverty-level students had higher percentages of assignments in courses which they were unqualified to teach than other public school teachers (ED, NCES, 1993). In fact, in schools with large percentages of students receiving free lunch, 40 percent of the teachers taught at least one math class and 20 percent of the teachers taught at least one science class out-of-field. In addition, 31 percent of the teachers taught at least one English class out-of-field and 18 percent taught at least one social studies class out-of-field. Because these figures are higher than the national averages, important questions of equality arise around the issue of teacher quality.

Looking at it from a student perspective shows the serious impact of the situation. Twenty percent of public school students (2.5 million) take math classes taught by out-of-field teachers, and 10 percent (1.3 million) take science classes taught by out-of-field teachers. Similarly, 10 percent of the nation's students take social studies, and 13 percent take English classes, taught by out-of -field teachers (ED, NCES, 1993).

Urban public school students match these national statistics in social studies and English. However, in math and science the picture is more dismal. In urban schools with 20 percent or more minority students, 25 percent of the students take math classes from out-of-field teachers; and in schools with 50 percent or more free lunch recipients, 24 percent of the students take math classes from out-of-field teachers and 14 percent take science classes from out-of-field teachers (ED, NCES, 1993; Ingersoll et al., 1995). The availability of qualified teachers, particularly in science and mathematics, and especially in urban schools that enroll high percentages of minority and poor students, is likely to be a major impediment to reform.

Other measures of teacher quality also show differences across teachers serving different student populations. In 1986, Texas administered the Texas Examination of Current Administrators and Teachers (TECAT), a state-wide recertification exam which measures basic literacy skills. Based on an analysis of teacher performance on this exam, Ferguson (1991) found that teachers who teach in heavily minority and lower socioeconomic school districts tend to have lower scores than their counterparts who teach in other districts. Ferguson also found that teacher test scores account for 20 to 25 percent of the variation across districts on student average scores on the Texas Educational Assessment of Minimum Skills (TEAMS) exam and that teacher test scores predict change in student test scores between the third and seventh grades. In a separate analysis, Ferguson (1991a) found that differences in teacher test scores account for 25 percent of the difference in reading and math scores between African-American and White children and 20 percent of the difference between Hispanic and White children. These findings suggest that qualitative differences between teachers of predominantly minority lower SES students and teachers of other students may have important and detrimental effects on urban students.

Preparation of math and science teachers. In a comprehensive review, Darling-Hammond and Hudson (1990) examined data on the preparation of mathematics and science teachers on five indicators: certification rates, college majors, college courses, pedagogical training, and self assessment of preparedness. They found that high school science and math teachers have slightly higher certification rates than junior high school science and math teachers, although at least 85 percent of both groups were certified. They also found that high school teachers were more likely to have majored in their fields than junior high school teachers: 84 percent of high school science teachers majored in their fields, while only 68 percent of junior high school science teachers did. Similarly, only 48 percent of junior high math teachers majored in math or math education, while 76 percent of the high school math teachers did.

Most mathematics and science teachers did not meet course requirements recommended by their professional organizations. For example, Darling-Hammond and Hudson (1990) found that only 34 percent of all elementary school teachers, 22 percent of junior high school teachers, and 26 percent of high school teachers met the recommended course requirements established by the NSTA. Similarly, only 18 percent of the elementary school teachers, 10 percent of the junior high school teachers, and 12 percent of the high school teachers were able to meet the course requirements recommended by the National Council of Teachers of Math (NCTM).

Darling-Hammond and Hudson (1990) also found that 90 percent of elementary school teachers and 80 to 90 percent of secondary school teachers have had some type of methods course(s) and that the vast majority of teachers feel adequately prepared to teach. They noted, however, that elementary school teachers feel unprepared to teach units in the physical and earth sciences, suggesting a need for more pre-service and inservice training in science.

Professionalizing Teaching. In the mid 1980s, two influential reports by the Holmes Group (1986) and the Carnegie Foundation (1986) argued that solutions to the nation's educational problems rested in increased teacher professionalism. Since then, efforts toward increased professionalization have taken three forms: increased certification requirements, increased participation in school decision making, and teacher involvement in differential incentive programs. Together these efforts aim to better prepare teachers to successfully operate in today's classrooms.

During the 1980s, almost every state required increased certification standards and successful completion of standardized tests as a means of increasing teacher preparation (Darling-Hammond & Wise, 1983; Murray, 1992). These efforts represented an attempt to better define the body of knowledge necessary for teaching and to ensure more strictly that all teachers have mastery of that knowledge. An important implication of state and national efforts to professionalize teaching through increased standardized testing is the adverse impact of such proposals on the diversity of the teaching force, particularly in urban areas (King, 1993; Smith, 1989).

Another movement toward teacher professionalism is reflected in programs designed to increase teacher participation in school decision making. Though its direct link to student outcomes has been questioned (Smylie, 1994), teacher participation in school decision making has been identified in the effective schools literature as an important aspect of successful schooling for urban students (Edmonds, 1979). This is discussed more fully in Part Two of this review in the section on reforms in governance and management of education.

Also associated with increased professionalization of teaching are differential incentive programs such as merit pay and career ladders. In merit pay programs, teachers are given bonuses or salary increases based on their ability to meet certain pre-established performance standards. In career ladder programs, teaching is divided into a series of steps, or ranks; each rank carries increased responsibilities (often outside of the classroom) and a higher salary. Both merit pay and career ladder programs have been criticized as promoting unhealthy competition between teachers and in the case of career ladder programs, removing teachers from the classroom (Conley & Odden, 1995; Smylie, 1994). Research indicates that teachers support career ladder programs but do not support merit pay programs (Smylie & Smart, 1990).

Work conditions of urban teachers. Teachers who teach in urban schools work under conditions that are more stressful than the conditions of teachers who work in other areas. Using the *High School and Beyond* data set, Purkey and Rutter (1987) compared the institutional contexts of teachers in urban-minority-disadvantaged schools and teachers in suburban-White-advantaged schools. In general, they found that it is more difficult to teach in the urban schools. Urban teachers have larger class sizes, spend 50 percent more time disciplining students, and are more likely to report that textbooks and other supplies are unavailable than are suburban teachers. Urban teachers report lower levels of self efficacy, lower expectations for their students, and higher levels of overall stress than do their suburban peers.

Further indications of the stressful working conditions of urban teachers can be gleaned from their responses to the latest Metropolitan Life Survey of the American Teacher (Leitman et al., 1995).The survey revealed that teachers who work in urban areas are more concerned about school violence, students bringing weapons to school, and student drug use than are teachers who work in other communities. In addition, more urban teachers consider overcrowding, student absenteeism, and the number of students who lack basic skills as serious problems than other teachers. These indicators of the stressful working conditions of urban teachers undergird Kottkamp, Provenzo, and Cohn's (1986) argument that societal change and intransigent school structures have combined to make teaching a very stressful occupation, one that is much more difficult than it was twenty years ago.

Teacher expectations. Given the changing demographics in the country, many educators, researchers, and policy makers argue that teachers should be trained to work effectively with students from different backgrounds. Teachers who have not been exposed to minority communities may have preconceived notions of minority students which lead to low expectations for the performance of these students. Teacher expectations are important because they have significant consequences for students academic and social growth (Irvine, 1990). In urban schools, where the majority of the teachers are White and the majority of the students are minority, these issues are particularly salient.

Teachers tend to have different academic and behavioral expectations for students based on a student's social class, race, and gender (Brattesani, Weinstein, & Marshall, 1984). These expectations are verbally and non-verbally communicated to students who then internalize and actualize them (Cruickshank, 1985 in Irvine, 1990; Edmonds, 1979). In a meta-analysis of the research, Dusek and Joseph (1985 in Irvine, 1990) concluded that teachers have higher expectancies for middle class students whose attitudes and behaviors most closely match the cultural norms of the school, but have lower expectations for other students.

Irvine (1990), in a review of expectancy theory and race, found that White teachers had more negative expectations towards African-American students than White students and that African-American teachers held more positive expectations for African-American students, particularly in urban schools. Similarly, in a meta-analysis of tracking practices, Gamoran and Berends (1987), found that teachers had more positive attitudes and expectations for students in higher tracks than they did for students in lower tracks. The expectancy research on gender has further revealed that teachers have higher expectations for students who behave in accordance with traditional sex roles (Kottkamp et al., 1986). Consistent with this view, teachers tend to have higher expectations for boys in math and science than for girls (American Association of University Women [AAUW], 1995).

Research also shows that teachers have differing expectations for students based on the student's family structure. While teacher expectations of divorced students have improved, expectations of students from never-married families are decidedly negative (Grymes et al., 1993). Fuller's (1986) finding that teachers, especially teachers over 35, had negative expectations for students from single-parent families corroborates a study by Levine (1982). Such expectations are particularly damaging for urban students, many of whom come from single-parent, never-married homes. In addition, low income and minority students appear to be more susceptible to teacher expectations than other students because, though teachers are significant in the lives of all students, these students are often more teacher-dependent (Coleman, 1966 in Irvine, 1990).

One way to reduce culturally and racially biased expectations in the classroom is to increase the number of minority teachers. Trend data indicate that the present cohort of teacher education students are not representative of the increasing diversity reflected in the student population (AACTE, 1988). Profiles of teacher education students (AACTE, 1988, 1990, 1994) indicate that the vast majority continue to be White females. In the *Research About Teacher Education* (RATE)III study (AACTE, 1994), 85 percent of students enrolled in teacher education programs were White and of that number, 76 percent were female. In 1989, Zimpher found that

91 percent of teacher education students were White and 76 percent of the students were female. Characterizing the majority of students enrolled in teacher education programs as "largely female, White, monolingual, and locally raised," Zimpher and Ashburn (1992) suggest that the average teacher education student has been culturally isolated and likely to have little understanding of cultural differences. For the most part, mainstream teacher education candidates have neither the desire nor the training to successfully teach racially and/or ethnically diverse students, the fastest growing portion of the student population (Zimpher & Ashburn, 1992).

To address this issue in the future, schools of education must simultaneously recruit minority teacher candidates and increase the cultural awareness of the teacher candidates now in the pipeline. For teachers already in the classroom, this discussion highlights the importance of effective inservice professional development programs that address cultural insularity within the teaching force.

Implications for reform. The research indicates that the urban teaching force consists of predominantly White females and that urban teachers tend to consider their jobs more stressful than teachers who work in other areas. Though the majority of these teachers hold at least a bachelor's degree and 95 percent are certified in their main fields, many teach one or more classes in subjects for which they have neither training nor certification. Because the rates of out-of-field teaching are higher in urban areas, issues of teacher quality and equity are raised. In addition, research indicates that urban teachers may see their students in terms of cultural stereotypes which have negative consequences for urban children. Given these circumstances, it will be especially difficult for urban teachers to meet the raised standards of performance required in current reform efforts. To do so, urban teachers will require high quality professional development that will provide them with the pedagogy and sensitivity necessary to work successfully with urban students.

Financial Resources

Finance issues are fundamental to education. In the United States the picture is complex, and simple statements about resource differences between urban districts and other districts are difficult to make. Unlike most industrialized countries, the U.S. system of education is decentralized; education resources are provided largely by state and local sources. The federal government provides only a small fraction, about 6 percent. As a consequence, there are large differences across states in the amount of resources allocated to education (ED, NCES, 1994), as well as across districts within states (Hertert, Busch, & Odden, 1994).

At the state level, average expenditures per student in 1991-92 ranged from $9,317 in New Jersey to $3,040 in Utah, more than a three to one differential (ED, NCES, 1994). In most states, local property taxes are a major source of school revenues and this reliance produces significant fiscal inequities across school districts. Some districts have a large tax base per student and, therefore, can generate considerable revenue while other districts are severely constrained by a low tax base. In states where reliance on local sources is low and the state contribution is large, differences in resources among districts are smaller, but overall levels of expenditures tend to be lower. In California, for example, where *Proposition 13* resulted in the state assuming major financial responsibility for education (66% of revenues in 1992) and high levels of resource equalization across districts, expenditures per pupil were $4,746, considerably less than the national average of $5,421. In New Jersey, by contrast, which has experienced repeated school finance reform litigation because of inter-district inequities, average per pupil expenditures in 1992 were 2.4 times the national average (ED, NCES, 1994). While, within states, wealthier districts typically have greater educational resources, the greatest source of variation across districts nationally is regional location. Districts in the northeastern region of the country have substantially higher expenditures per students than districts in the West, even after adjusting for cost and student-need factors (Parrish, Matsumoto, & Fowler, 1995). Using a national data base[3] Parrish, Matsumoto, and Fowler (1995) show there is greater variation in expenditures per student by region than by the percentage of students living in poverty, the percentage of minority students, or the urbanicity of the district. Thus, the poorest districts in New Jersey have resources that far exceed the wealthiest districts in California. In the USI districts, expenditure per student ranged in 1992 from lows of $3,644 in Memphis, Tennessee and $3,965 in Fresno, California to highs of $7,435 in Washington, D. C. and $7,652 in New Orleans (ED, NCES, 1995).

Parrish, Matsumoto, and Fowler (1995) produce other findings of central interest to this review. For example, districts with the highest percentages of minority students have higher expenditures than districts with the lowest percentages of minority students. When cost and student need adjustments are made,[4] however, the relationship is reversed: districts with high percentages of minority students have lower expenditures, or more accurately, lower buying power, primarily because minority students tend to live in urban areas where costs are higher and minority students are more likely to have greater needs because of poverty and limited English proficiency (LEP). The pattern is similar in districts with high percentages of LEP students. Actual expenditures are higher in districts with a higher fraction of LEP students, but the relationship is reversed for adjusted expenditures. The analysis by Parrish and colleagues also shows that urban districts spend slightly more than suburban districts and considerably more than rural districts; but when adjusted for cost and student need, they spend less than suburban districts ($4,195 vs. $4,389) and only a little more than rural districts ($4,064).[5] These results are important because they show that adjustments for cost and student need can affect analysis and understanding of expenditure levels in important ways. The same dollars buy different levels of services in different settings and are likely to produce different levels of output for different types of students.

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[3] They use the U.S. Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances, 1989-90 Common Core of Data, Census School District Special Tabulation.

[4] Cost adjustments are based on cost-of-living adjustments designed to distinguish between metropolitan and rural areas within each state (McMahon & Chang, 1991). The student need adjustment weights are as follows: special education students, 2.3; compensatory education students, 1.2; limited English proficient (LEP) students, 1.2.

[5] All of these results change somewhat with a full multivariate model, but the bivariate results reported here are more useful for the purposes of this review.

Debates about school finance become embroiled in debates about whether money makes a difference in terms of student achievement. Results of traditional production function studies that estimate the effects of expenditure related inputs (e.g., teacher salary, class size) on student achievement, suggest increased expenditures will not pay off in terms of tested student achievement (Hanushek, 1986, 1994a, 1994b). Card and Krueger (1992), however, find that money does make a difference in terms of labor market outcomes. While some research (Hedges, Laine, & Greenwald, 1994) refutes Hanushek's conclusions, most analysts agree that simply increasing funding is not sufficient to improve schools. Two common reasons are given. Some claim we simply do not have the "know how" to invest additional funds productively in education (Monk, 1992). Others argue that the complexity of the education process is not the problem; the central problem is that education professionals do not have appropriate performance incentives to make it work (Hanushek, 1994a).

The disappointing results from production function studies have led researchers to examine not so much resource levels, but rather its allocation. A number of studies have recently analyzed how education dollars are used by districts and schools. Sharp increases in educational spending during the eighties and fairly flat levels of student performance during this period have heightened interest in this area.

Picus (1993), using data on school district expenditures from the Census of Governments School Systems File (File D) and the Schools and Staffing Survey of the National Center for Educational Statistics, found that school districts across the country tended to spend approximately 60 percent of their resources on instruction, despite widely varying expenditure levels. Higher spending districts tend to have smaller class size and somewhat higher teacher salaries. Administration, combining district level and school level, typically accounts for about 8 percent of the budget. The remaining funds are spent on maintenance and operations, instructional support, and transportation. Most school district money is spent at the school level. Cooper (1993) reports that between 80 and 90 percent of district expenditures are at the school level.

While overall expenditure patterns are similar across districts, some differences have been found in the expenditure patterns of large urban school districts. Some of these differences are surprising. For example, while large urban districts are often criticized for high administrative spending, a number of studies have found that large urban districts tend to spend a somewhat smaller fraction on administration, largely because of economies of scale (Hannaway & Chun, 1993; Monk & Roellke, 1994; Parrish et al., 1995). Parrish, Matsumoto, and Fowler (1995) also found that urban districts tend to allocate a larger fraction of their expenditures to instruction than either suburban or rural districts, even with adjustments for cost and student need. The same pattern of higher spending on instruction was present for districts with higher proportions of students in poverty, who are minority, and who are limited English proficient than districts with lower proportions of these students. Using California data, where expenditure levels across districts are highly equalized, Hannaway and Chun (1993) found very similar levels of per student spending in urban and suburban districts on teachers' salaries.

The biggest difference among urban, suburban, and rural districts in spending patterns is in capital outlay. Suburban districts far outspend their urban and suburban counterparts (Parrish, Matsumoto, & Fowler, 1995). It is interesting that a study of expenditure patterns in urban New Jersey school districts that received additional funding as a result of finance reform, showed that they tended to spend their new dollars largely on capital expenditures (Firestone, Goertz, Nagle, & Smelkinson, 1994). The Parrish, Matsumoto, and Fowler results suggest this may be due to a pent-up need for expenditure in this area. Looking at more finely defined expenditure categories and actual staff allocations, Hannaway and Chun (1993) found differences between urban and suburban district allocations which suggest greater capacity on the part of suburban districts to respond to higher standards. The major expenditure categories were remarkably similar for the different types of districts, but suburban districts tended to allocate greater effort to curriculum and staff development, while urban districts allocated greater effort to special programs for students. They suggest these differences reflect the different demands placed locally on urban and suburban districts.

Recent research also looks at variation in expenditures across schools. Hertert (1995), for example, found substantial variation in expenditures across schools in California, largely determined by school type (i.e., elementary, middle, and high school). Nakib (1995) analyzed data across Florida schools and found little variation. Overall, little research has been conducted analyzing resource and expenditure patterns at the school level. However, some insight can be gained from results of a study that analyzed resource availability and allocation in high and low poverty schools in high and low revenue districts (Chambers, Parrish, Goertz, Marder, & Padilla, 1993). A main interest of the study was to examine the extent to which Title 1 funds were actually being used for supplemental services, as they are intended. In short, the study found little intra-district variation in measures of education program quality (i.e., cost per student, number of staff, class size, experience and education of teachers, and availability of instructional materials and equipment). Where there were differences, they tended to favor the high poverty schools. The study did find, however, substantial inter-district variation. High and low poverty schools in high revenue districts were able to use their Title 1 funds in ways that built on an already substantial base of support. Schools in low revenue districts did not have the same advantage. Current district accounting systems make it difficult to follow the flow of resources to the school level, however, so many questions remain about differences in allocation of effort at the school level.

Another area of increasing concern in urban areas is spending on special education. The passage of the *Education for All Handicapped Children Act* in 1975, in effect, created an "entitlement" program. A child diagnosed as handicapped has a legal right to "a free and appropriate education" and school districts must provide funds to support whatever education services are identified in the student's individualized education plan (IEP). The federal government funds only a small fraction of the cost and the level of state support varies from state to state. Districts must make up the difference, which is typically the lion's share of the cost. Urban districts typically have more children identified as needing special education and, therefore, incur greater costs than other districts. Lankford and Wyckoff (in press) analyzed district level data from New York state where school districts spent $12 billion more in the 1991-92 school year than in 1979-80. Lankford and Wyckoff analyzed how this money was spent. Overall they found a significant shift away from regular education to special education. The shift was particularly marked in New York City, where 53 percent of increased spending over this period went to special education and only 28.5 percent went to regular education. On a per student basis, spending for regular students increased only 7 percent while spending for special education students increased 62 percent. By 1993 Lankford and Wyckoff (in press) estimate that, as a consequence of special education demands in New York City, spending on regular students in New York City, where there are serious student performance problems, was nearly 20 percent lower than on regular students in other districts in the state. In a detailed analysis of expenditures in nine school districts from 1967 to 1991, Rothstein and Miles (1995) found similar results. Special education received 38 percent of increased expenditures; regular education received only 28 percent. Such sharp shifts in resource allocations, though not always apparent, have serious implications for equity in a system based on performance standards (Hannaway, in press).

Recent legal developments may affect school finance in the future. School finance reform is moving away from ideas of input or actual dollar *equity* across school districts and schools to ideas about *adequacy* (Clune, 1994a, 1994b, 1995). Equity refers to equal resources; adequacy refers to "resources that are sufficient (or adequate) to achieve some educational result, such as a minimum passing grade on a state achievement test" (Clune, 1995, p. 481). Adequacy represents a shift from input criteria to outcome criteria, and it explicitly acknowledges that some districts, for example, those with a high fraction of poor underachieving students, need more than equal resources to meet standards. Lack of full agreement about the objectives of education, and its measurement, and limited understanding of the technology of education, make any determination of adequacy of resources difficult. But recent court decisions in both New Jersey and Kentucky embody principles of adequacy. In New Jersey, for example, the 1990 *Abbott v. Burke* decision ordered higher spending in "special need districts", districts where student achievement was low and poverty was high. In other words, the court made compensatory aid a constitutional requirement. The extent to which adequacy theory will take hold in the states is yet to be seen, but a new theoretical basis for finance reform is beginning to develop. (See special issue of *Journal of Law Reform*, University of Michigan, Vol. 28, Spring 1995 for full discussion of adequacy theory.)

In sum, the research on financial resources and expenditures suggests that actual resource levels in urban districts are not generally lower than other districts; indeed they are often higher. However, when adjusted for student need and cost, expenditures in urban districts tend to be lower than in other districts. Allocations to special education appear to pose a particularly significant burden for urban districts. Furthermore, there is some suggestion that resource allocation patterns in urban districts differ in possibly important ways from allocation patterns in other districts, but research in this area is still at relatively early stages. Little is known at this point about the flow of resources to the school level and the effect of different allocation patterns on student performance. More research is clearly needed to know the extent to which, the ways in which, and the reasons why different types of districts and schools direct resources. Only with this understanding can we develop resource funding and allocation schemes to support reforms promoting higher standards of performance.

Special Programs for Disadvantaged Students

Urban schools and school districts receive funds and services from a number of federal sources, non-governmental school-based reform networks, and math-science intervention programs designed specifically for educationally disadvantaged students. These programs represent potentially important resources for systemic reform efforts in urban schools.

Most federal education programs were launched to "compensate" educationally disadvantaged students (Natriello, McDill, & Pallas, 1990). Federal policies guiding these programs have traditionally focused on keeping resources targeted on specific student populations, resulting in different eligibility rules and guidelines across federal funding sources, and requiring significant administrative oversight. Fragmentation, largely resulting from the categorical nature of these programs, has become a key issue for systemic education reforms. This section describes the major federal education programs that serve the largest numbers of urban students: Title I, Part A (formerly Chapter 1)[6]; the *Bilingual Education Act*; and two of the TRIO programs --Upward Bound and Talent Search, and the ways in which their current design may facilitate their contribution to systemic efforts.

Non-governmental reform efforts, some drawing on federal funds, have also emerged in recent years and resulted in reform networks which provide technical support to school-based efforts to improve schooling for disadvantaged students. Some of the most prominent of these are discussed below: Success For All (Slavin), The Accelerated Schools Model (Levin), The School Development Program (Comer), the Coalition of Essential Schools (Sizer), and High School Academies.

This section also discusses recently developed intervention programs specifically designed to increase minority and female participation in MSE (mathematics, science, and engineering) fields. These programs primarily target middle school and secondary students.

Title I. Title I provides support to supplement state and local funds for educational services for more than five million economically disadvantaged students across the country (Stedman, 1994). At the current time, most Title I funds, roughly $900.00 per eligible student (Chambers et al., 1993), support supplemental instruction in reading, writing, and mathematics primarily in elementary schools. Almost every school district in the United States receives some Title I funds, and Title I elementary schools are relatively evenly distributed among urban, suburban, and rural communities. The proportion of poverty students in schools receiving funding varies widely. The Title I schools with the highest percentages of students living in poverty are found in inner cities. In 1992, 61 percent of the Title I elementary schools with at least 75 percent of their students in poverty, were in inner cities, while less than 5 percent of the schools with less than 35 percent of students in poverty were in inner cities (Millsap, Moss, & Gamse 1993).

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[6] The 1994 reauthorization of the *Elementary and Secondary Education Act* (ESEA) changed the name of the Chapter 1 program back to Title I which was the name in the original legislation in 1965. For simplicity, we use the term Title I throughout

Evaluations of the effect of Title I on academic achievement of poor and low-achieving students have been mixed over the history of the program. Most recent research seems to concur that Title I has had only modest and uneven effects on student achievement levels and has not had a substantial effect on closing the performance gap between Title 1 students and their more economically advantaged peers (Heid, 1991; LeTendre, 1991; Natriello et al., 1990; Stringfield, Winfield, Millsap, Puma, Gamse, & Randall, 1994). Uneven findings on the effects of Title I are to be expected for at least two reasons. First, Title I funds can be used in different ways by different schools and school districts as long as they are targeted to particular students. Some uses of funds are likely more effective than others. In the late eighties, rather than look at overall program effectiveness, researchers began to shift their focus to identification of specific characteristics and strategies of successful Title 1 programs (Stringfield et al., 1994). Some of these results are discussed below. Second, Title I funds supplement existing state and local resources which are highly uneven across jurisdictions, as discussed earlier.

A 1993 study of successful elementary schools with high levels of student poverty indicated that while supplemental instruction can be useful, especially when designed to address specific needs of students who are experiencing temporary difficulty, the potential harm of a supplemental approach "comes from a focus on a sequence of basic skills taught out of context and from reliance on instructional aides who are often poorly educated" (Knapp et al., 1993, p. 376). In addition, Title I requirements designed to ensure that resources are targeted for specific students can lead to tracking those students in academic programs with separate, and often lower, standards of performance (Knapp et al., 1993). The congressionally established Independent Review Panel concluded in 1993 that "[N]o matter how good the Title 1 program is, supplementary services for 30 to 40 minutes a day cannot compensate. . . .[T]he whole school program needs reforming," and "basic and higher-order skills need to be learned together and high standards set for all children" (Independent Review Panel, 1993, p. 9).

The 1994 amendments to Title I addressed a number of issues which make it easier to incorporate Title I programming into systemic reforms. For example, in an effort to move Title I programming beyond basic skills, they require that the standards and assessments that apply to other students in the state also be used for Title I students. They also address problems of fragmentation by expanding local authority for establishing schoolwide programs, combining administrative funds, and consolidating planning across various programs for disadvantaged students.

Issues associated with resource allocation in the targeting of Title I funds are more difficult. Two issues were salient in the 1994 reauthorization: 1) Given the large number of students and schools receiving Title I funds, are those most in need getting enough resources?; and 2) Given the uneven distribution of state and local education resources, are Title I funds used to provide services in poor districts that wealthy districts routinely provide through regular funds? (Chambers et al., 1993).

The 1994 amendments attempted to address these concerns through a new targeted grant formula, more frequent updates to the poverty data used to determine program eligibility, and a requirement that schools with 75 percent or higher poverty rates in a district receive funding first. While the new targeted grant formula should result in a greater targeting of funds for high-poverty areas (Stedman, 1994), this formula will only be applied to dollars allocated above the 1995 funding level. If Title I allocations do not increase (and they are not are expected to increase for FY96), the existing targeting of Title I resources is not likely to change in ways that benefit schools serving high fractions of poverty students. The provision requiring 75 percent or higher poverty-level schools to be served first, however, may shift resources from elementary schools to secondary schools and more frequent updates of the poverty data, some educators fear, could undermine program consistency across years.

An analysis of the use of Title I funds in both low and high revenue districts found that both types of districts use funds for supplemental instructional services for disadvantaged students. In high revenue districts, however, other complementary services (e.g. health services) not available in low revenue districts, are locally provided. These additional services are likely to enhance the effectiveness of Title I programs in the high revenue districts. The 1994 reauthorization attempted in two ways to address concerns about the wide array of other needs that affect a child's learning. First, it established new provisions for coordinating Title I programs with other programs and services, and allowed Title I funds to be used as a last resort source of funding for health services (Stedman, 1994). Second, it expanded the requirements, funding, and programs for parental involvement.

While the 1994 changes will clearly make it easier to incorporate Title I programs into systemic reform efforts, they may create other problems. Some of the new flexibility provisions (e.g., schoolwide programs and coordination with other programs) may make it more difficult for schools and districts to ensure that Title I dollars flow to the most disadvantaged students. Schools operating their Title I program as a school-wide program, for example, are "not required to identify particular children as eligible to receive ... services, demonstrate that the services provided with Part A funds are supplemental to services that would otherwise be provided, or document that Part A funds are used to benefit only the intended beneficiaries" (*Federal Register*, September 21, 1995). An important question regarding the incorporation of Title I into systemic reform efforts will be how well schools are able to balance the need to target resources on the most economically disadvantaged students with the imperative of improving educational standards for all students.

Bilingual education. The federal government provides financial assistance for the education of limited-English proficient (LEP) students through Title VII of the *Bilingual Education Act* and through Title I of the *Elementary and Secondary Education Act*. Both were reauthorized in 1994. Although this section primarily focuses on the *Bilingual Education Act*, it is important to note that Title I also represents an important source of funding for many LEP students. In fact, Title I programs serve a far larger number of LEP students than programs funded by the *Bilingual Education Act* (August, Hakuta, Olguin, & Pompa, 1995). The 1994 reauthorization removed the requirement that Title I programs distinguish between educational need and limited English proficiency when determining student eligibility, paving the way for greater inclusion of LEP students in Title I services (Anstrom, 1995).

First authorized in 1968, the federal *Bilingual Education Act* recognizes that LEP students face several specific challenges including: segregated programs, disproportionate placement in special education, limited English proficient parents, and a shortage of educational personnel trained to serve them. As reauthorized in 1994, the *Bilingual Education Act* is intended to enable LEP children and youth to meet the same standards for academic performance expected of all children through the development of bilingual education and special alterative instruction programs. The law also provides funding for training of educational personnel who work with LEP students.

Much of the recent research and debate regarding the *Bilingual Education Act* has focused on the overall effectiveness of bilingual instructional strategies, and the effectiveness of bilingual instruction relative to immersing LEP students in an English-only instructional environment or to immersion programs that have an English-as-a-Second-Language (ESL) instructional component (e.g., Baker & deKanter, 1983; Gandara & Merino, 1993; Krashen, 1991; Lam, 1992). The 1994 amendments did not substantially address this very controversial issue.

However, the 1994 reauthorization of the *Bilingual Education Act* did restructure the grants available to LEAs in order to support systemic education reform strategies. Consolidated planning and program applications provide state and local education agencies with greater leeway to incorporate bilingual education programs into a broader reform strategy. These changes to the *Bilingual Education Act* allow for a more comprehensive approach to educating limited English proficient students. Important questions remain, however, regarding how effectively schools and school districts will incorporate LEP services into overall reform efforts.

TRIO Programs: Upward Bound and Talent Search. Collectively called the TRIO programs (because when they were first established in the late 1960s there were three programs), six major federal initiatives support and encourage the participation of students from disadvantaged backgrounds in postsecondary education. However, only two provide services to students while they are in secondary school: Upward Bound and Talent Search. During the 1990-91 reauthorization of the *Higher Education Act*, a supplementary Upward Bound program was created specifically to develop students' potential to excel in mathematics and science related fields -- Upward Bound Math/Science.

Upward Bound, Upward Bound Math/Science, and Talent Search provide funding to postsecondary institutions to work with high schools and community organizations to help economically disadvantaged youth develop the skills and motivation necessary for success in education beyond high school. Upward Bound serves high school students aged 13 to 19 who are low income and/or potential first-generation students to enter college. Upward Bound projects are intensive, requiring a six-week residential summer program designed to simulate a college experience for the participant. They also include other services to prepare the student for college. Upward Bound students continue to receive weekly services during the school year, on weekends, or after school.

Talent Search serves students between the ages of 11 and 27 who have completed the fifth grade. The services funded by the Talent Search program are less intense than Upward Bound. Talent Search only provides services during the school year. These might include: academic, financial, career, or personal counseling, career aptitude assessment, tutorial services, information on postsecondary education and financial assistance, assistance in completing admissions and financial aid applications, and in preparing for college entrance exams. Two-thirds of the participants served by individual Talent Search projects must be potential first-generation college students from low-income families.

In 1994, Upward Bound served 45,300 students, including students served in Upward Bound Math/ Science. Talent Search served 298,147 in the same year. These programs provide important services for students who may have less guidance and support from home for pursuing postsecondary education. A key issue here is how well the TRIO programs are coordinated with secondary schools and how they can be incorporated into systemic reform efforts.

School-based reform networks. School-based reform networks represent another resource for urban school reform efforts. This section discusses five of the most well-known of the reform models: Success for All, High School Academies, Accelerated Schools, the School Development Program, and the Coalition of Essential Schools. While all of the models include components which research has identified as important for improving the educational achievement of educationally disadvantaged students (e.g., parent involvement, focus on more advanced skills), each combines these components in different ways and with different emphasis.

Success for All is a highly structured instructional program that operates within the existing school organizational structure (McCollum, 1994). Materials are designed by specialists who then train teachers to use them. The use of individual reading tutors, frequent assessment, and a focus on prevention in place of remediation characterize the program. Two new elements have recently been added to the Success for All program: Mathwings (a constructivist mathematics curriculum for grades 1-5), and WorldLab (a social studies/science curriculum emphasizing simulations and group investigations). Together with the original Success for All Curriculum, these two new components make up the Roots and Wings program which is currently being implemented in ten districts (Center for Social Organization of Schools, 1995).

The other reform networks focus primarily on school-level change. The Accelerated Schools Program focuses on changing the philosophy of the entire school through facilitating local solutions to identify problems. The School Development Program approaches instructional reform through a reorganization of the traditional school structure designed to reduce the negative impact of change, social stratification, conflict, and distrust between home and school. Parental involvement is a key component of this model (Comer, 1984). The Coalition of Essential Schools provides a framework and philosophy for restructuring the traditional high school organization, practices, and beliefs in order to give students a more personalized education (Stringfield et al., 1994). The Coalition does not provide curricular materials or instructional methods. High School Academies present another alternative to the standard organization of the American high school. High School Academies typically function as schools within schools for high school students at risk of dropping out. These models vary from site to site (McCollum, 1994), but they generally offer academic content with job skills and employability training in a highly structured environment, but do not use a standardized curriculum. They also typically include support from a local business or public sector employer.

The most systematic research has been conducted on the Success for All program. An analysis of on the longitudinal effects of Success for All in fifteen schools in seven states, three to five years after initial implementation, provided encouraging evidence of improved student reading outcomes as well as program replicability (Ross, Smith, Casey, & Slavin, 1995). With the exception of one school (which may reflect an unusually successful comparison school), students in Success for All schools exceeded their control counterparts in reading performance in all grades. Although Success for All has a mathematics component, mathematics performance was not included in the study. This analysis builds on previous evaluation of the program in its original site in Baltimore (Madden, Slavin, Karweit, Dolan, & Wasik, 1993), and suggests that the program can be replicated successfully at other sights as well. The Reading Recovery program, which employs similar strategies to Success for All, including one-on-one tutoring, has also been shown to improve reading comprehension significantly (Ross et al., 1995).

High School Academies have demonstrated success at improving the academic performance and employability of high school students (McCollum, 1994) in the twenty years since the model was developed. "However, efforts made throughout the country to replicate the model have met with mixed results" (McCollum, 1994, p. 20).

Relatively little analysis has been done on the effectiveness of the other school-based reform models in terms of student achievement. However, there is some analysis of implementation and cost. McCollum (1994), for example, found that curriculum-based reform, such as Success for All, was easily implemented in a variety of contexts with "a minimum of prerequisites necessary to achieve a fit with the existing school culture" (McCollum, 1994, p. iv). However, the success of the program depended on the motivation and skills of individual teachers. Governance-based reforms, such as Accelerated Schools and the School Development Program, were dependent on the existing school context -- group dynamics and leadership within the school.

A cost analysis of Success for All, Accelerated Schools, and the School Development Program found that all three require additional resources but each takes the resources from a different part of the system. "The cost estimates developed show the Slavin model to be the most costly in additional expenditures. . .the Levin model to be the most costly in additional time requirements placed on existing school staff [and] the Comer model . . . leads in additional time requirements for parents" (King, 1994, p. 1). King described the three programs based on their levels of centrality. According to King the most prescriptive model is Success for All, the most facilitative is Accelerated Schools, and the School Development Model falls somewhere in between.

All five models provide participating schools access to additional technical assistance within the context of a reform network. While they represent different approaches, they share the goal of improving the performance of educationally disadvantaged students and include an instructional focus on advanced skills.

Math and science intervention programs. Intervention programs designed to increase minority and female participation in MSE (mathematics, science, and engineering) fields are fairly recent. They emerged from the realization that women and members of certain minority groups are severely underrepresented in MSE careers. Although the first programs were largely local efforts supported by local funding and addressing locally identified needs, they soon began to attract national attention. With national attention came federal and foundation funding (Malcom, Aldrich, Hall, Boulware, & Stern, 1984).

Math and science intervention programs have characteristics that set them apart from regular school programs in a number of important ways: they often operate outside of the school system; they serve groups that have been traditionally underrepresented in math and science fields, such as minorities, women, and disabled individuals; they are student centered rather than teacher centered; they use innovative instructional techniques, materials, and curricula; they often focus on addressing one subject area, such as math or science, rather than addressing the whole range of educational problems; they engage in activities that address many aspects of the problem, not just achievement; they employ multiple strategies; they are sensitive to the needs of the groups they serve and develop their intervention strategies based on those needs; they are sensitive to equity issues; they take into account the developmental needs of students; they attempt to foster students' motivation and self-esteem; and they often provide special training for their instructors (Clewell, 1987).

An early study of 168 pre-college intervention programs in mathematics and science by Malcom and her colleagues (1984) found that most programs served high school level students. Many of these programs were "bridge" programs for graduating high school seniors to give them a head start on freshman college work as well as programs run by colleges to recruit female and minority high school students as science and engineering majors. The study found that programs provided enrichment rather than remediation for participants. Long-term programs usually involved schools (teachers, counselors, and administrators) to affect the overall learning environment of the targeted students. Short-term projects usually focused on providing career or course-taking information relevant to careers to students, teachers, and/or parents. Often, exposure to role models was provided as well as an opportunity for limited hands-on activities and demonstrations. The study found that short-term programs were most effective when other structures in the community supported participants' information and education needs after the program expired.

Clewell and her colleagues (1992b) studied the characteristics and activities of 163 programs for middle school minority and female students in grades four through eight and found that while the majority (54 percent) targeted both females and minorities, 33 percent targeted minority students, and 13 percent served only females. There were twice as many programs serving students in the upper grades (seven and eight) in comparison to those serving students in grades four and five. The greatest number of programs were concentrated in the Western states (30 percent), followed by the Northeast (28 percent), then by the Central states (24 percent), and the Southeast (18 percent) (Clewell, Anderson, & Thorpe, 1992b).

Most of these intervention programs were in-school programs (62 percent of all programs). A number of them were cooperative ventures involving the school and a university or industry. Twenty-six percent of the programs provided services year-round. Only ten percent were conferences/workshops and five percent were competitions. Activities most often offered by programs were: hands-on activities, direct instruction, career/academic counseling, advisors, role models, guest speakers, and field trips. Programs also offered special projects, contests and science fairs, study group clubs, tutoring, test preparation, and job shadowing. The researchers found that very few of the programs had been evaluated, although many were generally thought to be effective. In fact, only 20 of the 163 had conducted rigorous evaluations.

The most successful intervention programs are institutionalized (Clewell, Anderson, & Thorpe, 1992a). This can take the form of program strategies and approaches being incorporated into regular classroom practice in a school district or districts. Or the techniques developed by a program might become part of a state's teacher education curriculum so that all teachers will use them. Unfortunately, achieving institutionalization is difficult, and although many excellent intervention approaches and strategies have emerged from these programs, relatively few have become part of regular classroom practice.

Implications for reform. Federal programs, non-governmental school-based reform networks, and math-science intervention programs designed specifically for educationally disadvantaged students represent potentially important resources for systemic reform efforts in urban schools. Although recent reforms of federal programs simplify the incorporation of these programs into reform efforts, the transition from fragmented service delivery to a comprehensive educational system based on high standards for all students has just begun, and has not reached the school level in many places.

Special Education

Another program of particular significance to urban schools is special education. The debate over how to address the needs of special education students, and how they fit into the larger school restructuring efforts, is ongoing and highly controversial. The themes driving this debate may be classified into three main categories: (1) inclusion or mainstreaming of children with disabilities into the regular classroom; (2) assessment and identification of children eligible for special education and related services; and (3) outcomes of the educational process. These broad categories encompass a host of issues, which directly affect not only special education but also regular education children.

Inclusion. The most hotly contested issue in special education today is whether or not to "mainstream" disabled children into regular classrooms. At the heart of this debate is the question of "the best way" to serve children with disabilities (Joy & Goertz, 1993). There is a great deal of evidence (dating back to the 1960s and 1970s) suggesting that special education--as a separate system--has failed to adequately serve its target population (Larrivee, ; Lipsky & Gartner, 1989). Today, researchers, advocates, and practitioners debate whether this system should remain separate (e.g., Fuchs & Fuchs, 1994; Kauffman, 1993) or whether special education students should be mainstreamed into regular classrooms (e.g., McDonnell & Kiefer-O'Donnell, 1992; McDonnell, McDonnell, Hardman, & McCune, 1991; Sailor, Gee, & Karasoff, 1993; Villa, Thousand, Stainback, & Stainback, 1992). In supporting their positions, those involved in this debate question the effects that inclusion and non-inclusion have on quality of education and teaching effectiveness and, consequently, whether each system can adequately serve its target population (Larrivee). To further complicate matters, distinctions must be made within the population of disabled students (e.g., specific learning disabilities, multiple disabilities, mental retardation), as these have a direct bearing on the issues at hand.

A review of the literature reveals that it is unclear whether the learning outcomes of children with disabilities are enhanced by incorporating them into regular classrooms, although many have found that mildly disabled students do benefit from a regular education setting (Larrivee). However, most regular teachers are probably not prepared to address the needs of both regular children and children with varying disabilities, as the current teacher education system traditionally has separated these orientations into two different areas of specialization.

Assessment and identification. Another equally controversial issue is that of assessment and identification. Researchers question the reliability of the system used to identify and classify children following the categories established under IDEA, the *Individuals with Disabilities Education Act* (McLaughlin, Schofield, & Warren, in press).[7] Critics attack both the methods utilized to assess disabilities and the structural incentives and disincentives (for schools, teachers, and parents) to increase the pool of students with disabilities. Norm-referenced tests, for example, are widely used to determine eligibility for special education--an evaluation technique whose accuracy and validity has been criticized for being racially and culturally biased (Ahearn, 1993) and for being inappropriate for special education students (Fuchs, Fuchs, Benowitz, & Barringer, 1987). Moreover, the budgetary environment affecting schools (Chaikind, Danielson, & Brauen, 1993), the specific ways in which states allocate/reimburse funds to local school districts (Richardson, Rogers, & Verre, 1994), the high costs of assessments (McLaughlin et al., in press) and special education services (Aron, Loprest, & Steuerle, in press), and the way in which the federal government reimburses states (which is done based on the number of special education students served)--all create incentives and disincentives for educators who must decide whether a child is to receive special education and related services. For example, a study of states' efforts to comply with federal legislation and regulations showed that the way in which states allocate funds--separating (Illinois) or combining (Massachusetts) regular and special education funds--and the way in which they deliver services affects the level of inclusion of disabled children in regular classrooms. In Illinois "[a]lmost every funding and delivery system regulation and guideline contains incentives for separation of children and disabilities from their peers"; only 33 percent of Illinois' disabled population are educated in regular classrooms at least 75 percent of the school day, whereas in Massachusetts, where incentives for inclusion are in place, 60 percent of the disabled student population are educated in regular classrooms (Richardson et al., 1994, p. ix).

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[7] Since its reauthorization in October 1990, the *Education of the Handicapped Act* (EHA) was renamed *the Individuals with Disabilities Education Act* (IDEA).

This difference is partly made possible by the loosely defined mild disabilities categories, which critics say lead to the misidentification of students who are slow learners or have emotional or other types of non-pathological problems which affect their performance (e.g., Skrtic, 1991). Critics also point to the lack of reliability of assessment tools which seem unable to distinguish among mild to moderate disability classifications (Gartner & Lipsky, 1987; Macmillan & Hendrick, 1993; McLaughlin et al., in press).[8] Others, however, suggest that these categories are capturing previously unserved yet needy children who (1) did not fit into the other, more rigorous categories but were nevertheless disabled in some way, and/or (2) were unidentified due to inexperience or lack of understanding of a new field within special education (Hallahan, 1992).

In contrast, some indicate that schools may want to classify low-performers as learning disabled students in order to exclude them from the testing population, thereby improving the school's average performance (Allington, 1992). Furthermore, researchers believe that teachers might want to purge their classrooms of low-achievers, while parents might want their children classified as special education students in order to qualify (or continue to qualify) for Supplemental Security Income (SSI) and other benefits (Aron et al., in press). All of these pressures--and possibly others as well--have led to a sharp increase in the number of special education students, at least partly resulting from a disproportionate increase in minority students

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[8] The three categories to which this sentence refers are: serious emotional disturbance, specific learning disabilities, and mild mental retardation. For a description, see *Federal Register*, September 29, 1992, Vol. 57(189), Part II, 34 CFR Parts 300 and 301, pp. 44801-44802.

(particularly African-American males) and students from low socioeconomic backgrounds (Lipsky & Gartner, 1989; Shapiro et al., 1993). This effect, as Milofsky (1989) points out, is exacerbated in urban areas, which are predominantly minority.[9]

Outcomes. Compounding the aforementioned issues is the fact that there is little if any connection between assessment and outcomes goals. Ahearn (1993) found that "[a]s the assessment process in special education developed, the use of assessment findings for planning instruction, evaluating progress or measuring outcomes has generally been ignored. Rather, testing is done primarily to answer the eligibility question with little link to the specifics of a student's program" (Ahearn, 1993, p. 3; see also Lipsky & Gartner, 1989). And, though required to review IEPs (Individualized Education Programs) at least once a year, states are not required to use assessments to evaluate progress (Ahearn, 1993). It is then not surprising to find that one quarter of special education students drop out of high school; that 43 percent of graduates remain unemployed three to five years after finishing high school; that almost one-third of special education students are arrested at least once after leaving high school; and that these students earn lower wages (Shapiro et al., 1993; see also Wagner, D'Amico, Marder, Newman, & Blackorby, 1992; Edgar, 1987; Edgar, Levine, & Maddox, 1986).

Costs. Special education programs are imposing increasingly higher costs on school districts, especially in urban areas, which could cut into funds available for reform. A discussion of this topic is included in the earlier finance part of the Urban Context Section.

Implications for reform. As the above discussion indicates, special education poses at least three critical issues for standards-based reform. The first issue is whether teachers will simultaneously be able to raise standards and adequately serve special education students in their classrooms. A second related concern is how to incorporate special education students into standards-based reform successfully. To which standards should these students be held? How should their performance be assessed? Research in this area is clearly needed. Lastly, school districts will have to embark on these often costly reform efforts while competing for scarce resources.

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[9] As a review of state and local operations conducted by the National Association of School Psychologists concluded, "current practices in assessment, eligibility, and special education service delivery are shaped by multiple influences. These include federal legislation and regulation, state legislation and rules, professional standards, the current state of knowledge and technology, individual decisions made by practitioners, community values, availability of resources and funding, training of personnel, parental involvement in educational programs, and numerous other influences." (National Association of School Psychologists, 1994; See also Gonzalez, Ahearn, & Osher, 1994).

REFORM STRATEGIES AND STANDARDS

This section of the report describes the current education reform movement and identifies strategies that support this reform in the areas of teaching and learning; teacher professional development; governance, organization, and management; parental involvement; and school-business partnerships. It begins with an overview of development of the current systemic reform movement and discusses the implications of standards-based systemic reform for educational equity. It then discusses five areas of current active reform: teaching and learning practices; teacher professional development; governance, organization and management; family involvement in schooling, and school-business partnerships.

Systemic Reform and the Urban Context

The 1983 report, *A Nation at Risk,* by the congressionally authorized National Commission on Excellence in Education, launched over a decade of school reform efforts that continue to the present. In recent years, a consensus has developed among policymakers and leaders of the education community around standards-based systemic school reform strategies. These involve a realignment of teaching and learning and the systems that support teaching and learning to achieve specific student learning goals, or standards. The movement is based on the notion that all children can learn challenging content and develop complex skills. However, the political, demographic, and economic diversity and scarce resources of the urban environment pose unique challenges to this reform effort. A number of critics of standards-based systemic reform have identified equity and the increased emphasis on student assessment as an accountability mechanism as the greatest problems with reforms based on higher standards for all students. This section provides a brief synopsis of the political development of standards-based systemic reform; presents the elements of an idealized form of standards-based systemic reform; describes the conflict over the conceptualization of educational equity within this reform framework, and identifies the challenges of using student assessments for accountability.

Historical and Political Development

In September of 1989, President Bush and all 50 of the nation's Governors met for an unprecedented education summit in Charlottesville, Virginia, and articulated a nationally shared vision for U.S. education. This meeting laid the groundwork for six national goals for education that addressed the entire educational experience from early childhood to life-long learning and called for all students to demonstrate competence in challenging subject matter as preparation for responsible citizenship and productive employment. The National Education Goals Panel was established in 1990 to monitor and report on the nation's progress toward the National Education Goals. The process used by the Goals Panel to develop indicators of student performance made evident the lack of a national consensus on what constitutes competence in challenging subject matter and led the Congress to create the National Council on Education Standards and Testing (NCEST). In 1992, NCEST released its report, *Raising Standards for American Education*, which supported the development of high national standards tied to a system of student assessments. The council pointed to standards as a mechanism for creating high expectations for all students and allowing better targeting of educational resources (NCEST, 1992).

On March 31, 1994, with President Clinton's signature on the *Goals 2000: Educate America Act*, the federal government officially adopted a standards-based education reform strategy. *Goals 2000* was developed to provide a framework for national education reform and for the reauthorization of all Federal education programs. Designed based on the principle that "all elements of the education system should support the achievement of challenging, [internationally competitive], academic standards by all children" (*Goals 2000*, Sec. 2, 6B), *Goals 2000* provided technical support and financial resources to help states, communities, and schools develop educational improvement plans based on world-class standards.

The 1994 reauthorization of the *Elementary and Secondary Education Act* (ESEA), the *Improving America's Schools Act* (IASA), altered existing federal education programs to fit into the framework described by *Goals 2000*. The amended ESEA provides nearly $11 billion annually to school districts and schools to improve teaching and learning, primarily for economically disadvantaged students.

Until the November 1994 Congressional elections, support for standards-based education reform among policymakers had been largely broad-based and bipartisan, although a number of the elements of standards-based reform remained controversial. The current Republican led Congress has proposed to place much greater limits on the federal role in education than that proscribed by *Goals 2000* and the IASA, and significantly reduce or eliminate funding for *Goals 2000*.

Standards-based systemic reform evolved on a parallel track within the various communities of education practitioners, and national standards-development projects are in progress in several content areas. The June, 1989 release of *Curriculum and Evaluation Standards for School Mathematics* by the National Council of Teachers of Mathematics (NCTM), marked the first standards-based response by the education community to the challenges posed by *A Nation At Risk*. The NCTM standards have served as a benchmark against which State and local efforts to develop mathematics standards are measured and as a prototype for the development of curriculum standards in other academic areas. In December of 1995, the National Research Council, with support from the U.S. Department of Education, released the *National Science Education Standards*.

Most states also continue to move forward with a standards-based systemic reform strategy. A recent survey by the American Federation of Teachers (AFT) found that every state except Iowa is developing academic standards, and a number of states have begun the process of aligning the elements of the educational system around the standards. Table 4 includes indicators of state-level progress in systemic reform for states that have cities which received Urban Systemic Initiative grants (See Appendix A4).

The Basic Elements

Standards-based, systemic education reform proposes to fundamentally alter the systems that support teaching and learning to accomplish two basic goals: improve overall student performance and ensure that educational opportunity is distributed equitably. In its idealized form, standards-based or content-driven education reform includes the following elements:[10]

- ***Develop content standards*** that describe what all students should know and be able to do, organized by content area and which represent a significant upgrade of the quality of the content; ***develop performance standards*** which represent a significant increase in the level performance than was previously in place, and ***hold the expectation*** that *all* children can meet the standards. Content and performance standards should be developed through a broad-based process which engages key educational stake-holders and should reflect the best thinking in the disciplines.

- ***Align the fundamental elements of the education infrastructure*** most directly tied to teaching and learning --assessments, curriculum, professional development, and instructional material -- with the content and performance standards. This means assessing student performance in relationship to the standards.

- ***Restructure the systems that support teaching and learning*** so schools have the capacity and the incentive to design and implement effective strategies for preparing their students to learn to the standards. This includes changing the fundamental organization of schools -- governance, finance, and accountability. It represents a shift toward performance-based accountability measures that include student assessment. It also means creating meaningful links to non-educational social services, and creating a safe and drug- and alcohol-free learning environment.

One reason this approach is "systemic" is that it changes the school system all children encounter rather than simply adding another new program designed to meet the needs of specific student populations. Systemic reform requires changes in policies at all levels of governance which impede this alignment, from teacher licensure to textbook purchase. Another way in which the reform is systemic is that it strives to create greater coherence across non-educational services.

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[10] These elements are included in descriptions of the standards-based reform by O'Day and Smith, 1993 and in the *Goals 2000: Educate America Act*, Title III.

Equity and Assessment

Some of the strongest opponents of standards-based systemic reform criticize this approach because of the potential implications for educational equity, especially for low-performing students. For most of the past fifty years, educational equity in the United States has been based on providing equal educational opportunities. Since the Supreme Court ruling in *Brown v. Board of Education* recognized a relationship between resource inputs and the effects of schooling, accountability for equal educational opportunity has been addressed through the legal system with the focus on reducing inequities in the distribution of public educational resources. While this input-based approach to holding systems accountable for ensuring educational equity has resulted in a more equitable distribution of public educational resources coincident with reductions in student performance disparities, it remains problematic for a number of reasons. First, as discussed in the section on financial resources, economic research has been unable to establish a consistent relationship between the monetary inputs to schooling and student performance. In addition, simply guaranteeing equal inputs does not guarantee that those inputs will always be used in the most effective ways; thus it does not guarantee equitable outcomes. Finally, a long history of local control of education and educational resource distribution, poses significant challenges to truly equal resource distribution; decades of legal battles have not resulted in equal distribution of resources across schools and school districts.

In a standards-based educational system, equal educational opportunity is defined as holding the expectation that *all* students can meet high standards. Within this framework, if students are systematically held to different educational standards -- based on individual characteristics or the characteristics of the schools they attend -- then the system is not providing students with equal educational opportunities. This focus on specific student outcomes represents a shift away from the focus on the educational services provided. Accountability for students and schools within the standards-based framework is based, at least in part, on assessment of student achievement.

However, basing student and system accountability on performance may not be enough to ensure educational equity. Even some of the most ardent advocates of standards-based reform have expressed concern about attaching high stakes to assessment results for students, particularly when it is more likely that students from low income families will have less access than their more affluent counterparts to the types of instruction that would serve them well on these new (performance-based) assessments (Porter, 1992). Professional organizations have also expressed concern about using student assessment as a primary tool for school accountability. These concerns are exacerbated by the fact that a number of questions regarding the validity and reliability of new performance based assessment tools remain unanswered (Koretz, 1995; Linn, 1995).

O'Day and Smith (1993) have proposed accountability with a broader basis than student assessment. They argue that standards-based reform should create a clearer relationship between educational inputs and student outcomes. To facilitate this, they develop three types of school educational inputs and student outcomes. To facilitate this, they develop three types of school standards against which the educational opportunity provided could be measured: resource standards, practice standards, and school performance standards. Using similar reasoning, the NCEST report arrived at the concept of school delivery standards to provide "a metric for determining whether a school delivers to students the opportunity to learn well the material in the content standards" (NCEST, 1992, p. E-5). This concept appeared again in the *Goals 2000: Educate America Act* in the provisions for "opportunity to learn standards," which were defined as "the criteria for, and the basis of, assessing the sufficiency of quality of the resources, practices, and conditions necessary at each level of the education system to provide students with an opportunity to learn the material in voluntary national content standards or State content standards" (*Goals 2000*, Sec 3, A7). However, opportunity-to-learn standards, as conceptualized in *Goals 2000*, did not include high stakes for schools, school districts, or states. The opportunity-to-learn standards were one of the most contentious aspects of the *Goals 2000* legislation at the time of its passage, and continue to be a target for elimination by Republican members of Congress. Without school delivery standards or opportunity-to-learn standards, some argue that standards-based reform will simply hold already poor-performing students to higher levels of achievement without providing them increased opportunities. Thus, these students would be worse off after the reform.

Reforming Teaching and Learning Practices for Disadvantaged Urban Children

In tandem with the movement towards standards-based systemic reform of education, research on the teaching and learning of disadvantaged students has been taking place. In some cases this research has had a far-reaching impact on the education reform movement itself. For example, the recent findings in cognitive psychology and linguistics suggest that acquisition of basic skills is not a prerequisite for developing higher-order thinking skills (Knapp & Shields, 1990). In other cases, this research has influenced changes in the way educational systems respond to the challenge of educating at-risk students, especially those in inner-city schools.

This section first discusses two main strategies traditionally used by schools in teaching disadvantaged students--ability grouping/tracking and retention in grade. It goes on to describe emerging strategies that have been suggested by more current research for the teaching of this population and the implications of these strategies for mathematics and science education reform.

Traditional Approaches in the Teaching of Disadvantaged Children

The two main organizational strategies used by schools to respond to the challenges posed by the education of "at-risk" students have been instructional grouping and retention. These have been used since the late nineteenth century (U.S. Department of Education [ED], OERI, 1993). Special education and Title I pull-out programs are two more recent programmatic efforts to provide better education to students at-risk (ED, OERI, 1993). These have been discussed elsewhere in this report.

Ability grouping and tracking. The practice of separating students into more homogeneous subgroups according to learning ability or potential (i.e., IQ) is referred to in the literature as "ability grouping." This phrase applies to different grouping techniques, which include: (1) grouping by academic subjects divided into different class levels to accommodate students of varying abilities (Oakes, 1987); (2) tracking, which applies to highly stratified organizational systems characterized by "tracks" of courses (e.g., honors, high, average, vocational) to which students are assigned; and (3) pedagogical techniques such as ability grouping in a heterogeneous class. The latter (also called within-class ability grouping) is prevalent mostly in elementary schools; while the first two (also called between-class ability grouping) are commonly found in middle/junior and senior high schools (McPartland, Coldiron, & Braddock, 1987).

Common to almost all schools is the application of one or more of these forms of grouping and segregating students--within-class and between-class ability grouping. Though prevalent in U.S. schools today, ability grouping, in all its forms, is the subject of much controversy.

Between-class ability grouping. In order to determine whether ability grouping leads to equitable opportunities for all students, research has been conducted to answer three main questions related to the effect of between-class ability grouping: 1) Does tracking foster student achievement? 2) Does tracking hinder student achievement? 3) Is the placement process fair and accurate?

Numerous outcomes-based studies have been conducted to answer the first question. The results have been mixed, but the majority contradict the belief that tracking consistently fosters learning among all students (Oakes, 1987). Some studies have found advantages for students placed in the top tracks (Brewer, Rees, & Argys, 1995; Gamoran, 1986; Lee 1986; Rock, Ekstrom, Goertz, Hilton, & Pollack, 1985); yet others suggest that high achieving students would benefit from small, heterogeneous, cooperative classrooms (Slavin, 1983; Webb, 1982). The positive effect of tracking for students placed in advanced and gifted courses found by Kulik and Kulik (1982) in their meta-analysis of 52 studies was small. In an attempt to reconcile what appear to be conflicting results of different studies, Slavin (1990) conducted a "best-evidence synthesis" of 29 studies which compared ability-grouped classrooms to heterogeneous ones. He concluded that "the effects of ability grouping on student achievement are essentially zero" or negligible for all achievement levels, high, average, low, etc. (Slavin, 1990, p. 484).

Studies also indicate that tracking adversely affects those placed in low track classes. Thomas Hoffer, comparing average student achievement in middle school math and science among grouped and non-grouped schools, found that high-group placement has a "weak positive effect while low-group placement has a stronger negative effect" and, *overall*, tracking has no significant benefits (Hoffer, 1992, p. 221).[11] In other words, ability grouping benefits upper track students, to a small extent, and harms students placed in lower tracks to a greater extent. Other researchers have also found that--after controlling for variables such as socioeconomic status--those in the accelerated tracks benefit from tracking, while those in the lower tracks do not (e.g., Dar & Resh, 1986; Gamoran & Berends, 1987; Gamoran & Mare, 1989; Sorensen & Hallinan, 1986). This effect appears to be the result of several factors, such as time and quality of instruction, expectations, student self-esteem and behavior, and classroom climate.

The negative effects of tracking are further exacerbated in mathematics and science education, as tracking affects not only the quality (more or less advanced classes; more or less prepared teachers) but also the number of courses that students may take (Gamoran, 1987). More importantly, over time, the effects of tracking are compounded and differences among tracks widened, as students who do not take prerequisite courses are prevented from taking more advanced classes in these fields (e.g., Oakes, 1985; Oakes & Guiton, 1995).

Oakes (1985) also established that tracking decisions are not based exclusively on academic merit, but are the result of the dynamic interplay of several factors, namely, scores on standardized tests, teacher and counselor recommendations (including grades), and students' and parents' preferences. These factors, however, are imperfect measures of student ability.

Researchers have also found a strong relationship between tracking and both race and socioeconomic status (Oakes, Gamoran, & Page, 1992). There is solid evidence that indicates that poor and minority students are disproportionately represented in the lower tracks, and disproportionately underrepresented in the upper tracks; while the opposite is true of Whites and Asians (Brewer et al., 1995; Oakes 1985; Oakes & Guiton, 1995). This seems to result from a convergence of different factors--chief among which are (1) teacher and counselor biases and misconceptions of poor and minority students (Oakes & Guiton, 1995) and (2) a self-preserving system in which students who are placed in the lower tracks in their early school years do not receive adequate academic preparation to move into the upper tracks later on (Oakes, 1985).

Within-class ability grouping. It is unclear whether within-class ability grouping (teaching a few homogeneous groups within a class) positively affects student achievement. Some researchers (e.g., Koontz, 1961) indicate that this form of grouping does not yield higher achievement outcomes. In contrast, in his best-evidence synthesis of elementary school ability grouping literature, Slavin (1987) concluded that, if operated in the correct setting, within-class ability grouping, could be successfully utilized to improve achievement levels in heterogeneous classrooms, and proposed the use of this technique as a component of cooperative learning, an alternative to between-class ability grouping (Slavin, 1990).

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[11] In reviewing studies that indicate that the overall effect of tracking is zero, it is critical to remember that this is an *aggregate* effect which, as in the case of Hoffer's study, may result from positive high track effects canceling out negative low track effects. (In Hoffer's case, there was a weak positive effect and a stronger negative one, but, due to greater numbers of students participating in upper track classes, these two effects canceled each other out.)

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Retention. Retention, the practice of holding back students who have not demonstrated the required level of proficiency for promotion to the next grade level, has been commonly used as a response to the challenge of educating low-achieving students. The bulk of the research evidence shows that retention, as currently practiced in most schools has mostly negative effects on student learning (Holmes, 1989; Shepard & Smith, 1989). Retention in grade has also been linked to increased risk of dropping out of school (Grissom & Shepard, 1989; Natriello et al., 1990).

Challenges to traditional approaches. The strategies of tracking, retention, special education and Title I that have been traditionally used by schools to respond to the needs of underachieving students have been called into question recently. Although the general theory underlying these strategies is the accommodation of student diversity and support for increased learning by the matching of instructional content to the needs of individual students, research shows that these strategies may do more to limit than increase learning opportunities and achievement (ED, OERI, 1993).

In addition to changes in Title I (described in the special programs section of this report) and an emphasis on early prevention programs, approaches have emerged that represent a radical departure from the traditional approaches to teaching underachieving students. These emerging approaches recognize that children can tackle challenging material without having mastered basic skills; emphasize pedagogical techniques that use students' prior knowledge, socio-cultural experiences, and strengths as stepping stones to further learning; view the classroom as a learning community; and see education as a process of socialization--rather than instruction--into ways of thinking, knowing, valuing, and acting that are characteristic of particular disciplines (Resnick, 1988). This new vision of teaching and learning, because of its profound influence on the reform movements in mathematics and science, has had far-reaching implications for both curricular and instructional reform.

A New Vision of Teaching and Learning

During the past thirty years the practice and study of schooling have been influenced by other disciplines such as psychology, sociology, anthropology, and linguistics. For example, the discipline of sociology, which viewed non-mainstream families as pathological, contributed to the development of the culturally deficient model of education. This model saw the cultural and experiential backgrounds of non-White and/or poor students as lacking or deficient; compensatory programs were developed to address this perceived deficit (Hollins, Smiler, & Spencer, 1994). The cultural difference theory attributes the academic problems of students of color to cultural differences between the home and the school (Villegas, 1991). Weber (1971), in a benchmark study that reframed the discussion, conducted a study that identified four successful programs for teaching reading to inner-city children. His research identified characteristics of effective instruction rather than focusing on the life conditions of children (Hollins et al., 1994). The work of Edmonds (1979) followed with his identification of characteristics of effective schools and school leadership for low-income inner-city students.

The discussions of effective instruction was subsequently reframed to focus on the process-product view (such as that found in direct instruction) or mastery learning. This view was based on the assumption that there are universal or generic qualities of instruction that work for all children regardless of culture or background experiences and is tied to a universalistic view of child growth and development (Hollins et al., 1994). Ethnographic studies by Good and Brophy (1987), and by Heath (1982) expanded the discussion on effectiveness to include teacher behaviors. Heath's work also highlighted the discrepancy between the home culture of some students and the mainstream classroom practices they experienced.

Culturally Responsive Instruction. Hollins (1982) was one of the first to apply the theory of cultural congruence to instruction for African-American children. The overall hypothesis in research on cultural congruence is that students of different backgrounds often are unsuccessful in school because of a mismatch between the school culture and the culture of their homes and communities (Au & Kawakami, 1994). A related hypothesis is that students of diverse backgrounds learn better if classroom instruction is provided in a manner congruent with the culture of the home. This type of instruction has been called "culturally compatible" instruction (Jordan, 1985) or "culturally responsive" instruction or teaching (Erickson, 1987; Villegas, 1991).

Research on cultural congruence has been conducted in five main areas: dialect speakers, participation structures, narrative and questioning styles, ESL students, and peer groups. The following summarizes the findings in each of these areas.

Research on speakers of non-mainstream varieties of English suggests that performance may be improved when teachers are able to recognize and build upon the linguistic strengths of these learners. When teachers make the mistake of assuming that a student's language is somehow inferior, the student's academic achievement might be threatened (Boykin, 1984; Collins, 1988; Labov, 1966, 1970; Labov & Robbins, 1969; Piestrup, 1973).

Research on participation structure confirms the importance of conducting lessons in a manner consistent with the values of students' home cultures, even if it means departing from conventional classroom practice. These departures may include addressing questions to the group, permitting students to collaborate in responding to questions, and not spotlighting individual children (Au, 1980; Au & Mason, 1981, 1983; Boggs, 1972; Mohatt & Erickson, 1981; Philips, 1972; Watson-Gegeo & Boggs, 1977).

Classroom styles of telling stories or answering questions may be unfamiliar to students because they differ from those used in students' homes and communities. Mainstream teachers may be unaware of this and expect students to use these styles in the classroom. Knowing of these differences may assist teachers in making adjustments that allow students to participate successfully in class and to learn typical classroom norms for telling stories or answering questions (Heath, 1982, 1983; Michaels, 1981; Michaels & Collins, 1984).

Teachers of students who speak a non-mainstream variety of English or who have a first language other than English may lower their expectations of academic achievement and provide less effective instruction. Successful teachers respect the language students bring from their homes and communities and provide culturally congruent instruction by capitalizing on students' existing language ability (Cazden, Carrasco, Maldonado-Guzman, & Erickson, 1980; McCollum, 1989; Moll & Diaz, 1987; Ramirez, 1981).

In classrooms with students of diverse backgrounds, peer relationships and peer group norms may play an important part. Students may enter school with an orientation toward receiving instruction from peers rather than adults and their teachers may inadvertently contradict peer group norms for instruction, causing students to resist or oppose school activities. Teachers can alter the conventional organization of a classroom to build on the positive aspects of peer relationships such as students' willingness to help one another and thereby improve students' chances for academic success (Cazden, 1988; D'Amato, 1988; Fordham, 1991; Fordham & Ogbu, 1986; Gallimore, Boggs, & Jordan, 1974; Jordan, 1985; Ogbu, 1978; Vogt, Jordan, & Tharp, 1987; Weisner, Gallimore, & Jordan, 1988).

Proponents of culturally responsive pedagogy argue that effective classrooms can be achieved, even in settings where there is a wide representation of diverse cultures, through the creation of a composite classroom culture that promotes academic learning. In the opinion of proponents, composite cultures cannot evolve in situations in which schools follow conventional mainstream practices (Au & Kawakami, 1994). Research indicates that culturally congruent styles of teaching can be learned. With the growing number of students from diverse cultures entering the nation's classrooms, it is evident that such training should occupy an important place in teacher education programs.

Culturally Responsive Instruction in Math and Science Education. Culturally responsive instruction was not developed specifically for mathematics and/or science instruction, although it can be used effectively in math and science classrooms. The following examples illustrate how this strategy was used in the development of an effective mathematics program for urban disadvantaged youngsters and a bilingual science program for Latino LEP students.

Project SEED. Project SEED was started in 1963 by a teacher of general mathematics, William Johntz, at Berkeley High School, where most of his students were minority (largely African-American) students. Project SEED works with minority and low-income elementary school students to increase classroom participation, enhance their academic self-confidence and raise mathematics achievement scores. Students in Project SEED learn high level mathematics concepts while still in elementary school and their success in high level math, such as algebra, is used by SEED as a vehicle for raising self-confidence about academic endeavors in general (Clewell, Anderson, & Thorpe, 1992a).

The project's approach is based on three basic postulates: 1) Educationally disadvantaged children do poorly in school because they believe that they are inferior and because their teachers have low expectations of them; 2) The most effective way to counter this feeling of inferiority is to help them experience success; and 3) At-risk children can and will learn high school and college algebra if it is taught by someone who is highly trained in mathematics and the discovery method. Specific instructional techniques involve the teaching format, which is the Socratic discovery method -- a method which emphasizes traditional lecture and concentrates on leading students to discover mathematical concepts for themselves through a series of carefully developed questions. The technique also provides immediate feedback as to whether students are learning the material.

Additionally, the project involves students in their own learning process. They are encouraged to participate through hand signals and other activities, which let the instructor know whether they agree or disagree with or are not sure about a particular answer. Observers have noted that the activities include features common to African-American culture such as audience participation, choral responses, cooperation, collective responsibility for problem solving, flexibility, and strong adult leadership (Hollins et al., 1994). At each grade level the curriculum sequence is carefully designed to involve students in an in-depth inquiry of a unified body of mathematical material. Curriculum is presented in a spiral manner with investigation of previous topics being repeated in the study of new material to reinforce and deepen students' understanding (Hollins et al., 1994).

What began as an effective approach for low-income African-American students has been expanded to include a variety of culturally diverse populations, including LEP students. Several rigorous evaluations have documented its effectiveness in improving mathematics achievement, decreasing the probability of repeating a grade, and increasing the likelihood of advanced course-taking in mathematics at the secondary level (Clewell et al., 1992a).

Descubrimiento/Finding Out: The Program for Complex Instruction. The primary goal of the Program for Complex Instruction, which has been located at Stanford University since 1978, is the implementation of an instructional approach to the development of higher-order thinking skills that is useful for heterogeneous elementary classrooms in which a wide range of academic skills and cultural, racial, and linguistic characteristics are present. The program includes an innovative instructional approach, curriculum and materials (Descubrimiento/Finding Out), and a model for teacher training and organizational support. This description will focus on the classroom implementation model component, which includes the curriculum and materials and the instructional approach.

The curriculum was developed with a Piagetian theoretical framework (DeAvila, Havassy, & Pascual-Leone, 1976) and differs from other experiential science curricula in that the activities apply science and mathematics to everyday life using problems and materials that are familiar to most children, regardless of language or culture. The instructions and work sheets are presented in Spanish, English, and pictographs. The activities are designed to enrich the repertoire of each child, regardless of developmental level (Clewell et al., 1992a). The activities require individual questioning and experimentation and incorporate many of the characteristics of pure discovery. In addition to emphasizing how children think through a problem, the activities also provide children

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with the skills necessary for academic progress: sorting, measuring with or without numbers, estimating, comparing, predicting and others. Language development takes place at the same time as students learn new terminology, read directions, and report their results.

Classes are organized into learning centers where no more than five children engage in an activity related to the central theme. Different groups of students work with different materials and perform different tasks with minimal direct instruction or supervision from the teacher, who delegates authority to working groups of students. This delegation of authority is accompanied by a system of cooperative norms and assigned roles (Lotan & Benton, 1990).

The program has been evaluated with student achievement data from several standardized tests. Consistent pre-post test score gains were found for all important measures over a number of years.

Other Effective Approaches to Mathematics and Science Education. In a thought-provoking article on the implications of reform in mathematics education for teaching and learning of mathematics, Putnam and colleagues (Putnam, Lampert, & Peterson, 1990) anticipated current discussions on this topic. After considering three research traditions: cognitive psychology, mathematics, and classroom practice, they asked the question: How can school practice be shaped to deal with the tensions that are created in considering these diverse perspectives? The response that emerged, while not definitive, is illuminating. It suggests that three aspects of knowing mathematics, each representing one of the three traditions, be present in mathematics teaching. The first is that instruction be built around the "big ideas" fundamental to mathematics and mathematics thinking; the second is that attention be paid to the conventions of mathematics that must be presented to students, such as the symbols, representations, and other tools; and third, that importance be given to making mathematics meaningful to the learner in the sense of relating it to students' existing knowledge.

One approach that blends these aspects of knowing mathematics is Cognitively Guided Instruction (CGI). CGI was developed to help teachers build on the knowledge that children bring with them to the classroom. Developed ten years ago by mathematics educators at the University of Wisconsin-Madison as a research program to study the impact of research-based knowledge about children's thinking on teachers and their students (Carey, Fennema, Carpenter, & Franke, 1995), CGI is based on the belief that if teachers possessed research-based knowledge about children's thinking in general, then they would focus more on individual children. In other words, this knowledge would help teachers to make decisions about instruction based on a child's mathematical thinking rather than on some expectation of how a child is supposed to perform based on group membership such as race/ethnicity, gender, or socioeconomic status (Fennema, Franke, Carpenter, & Carey, 1993). Evaluations of CGI classrooms showed that students in these classrooms spent more time solving problems and were more successful in solving complex addition and subtraction problems than those in a control group. Also, CGI teachers were more likely to focus on their students' solution strategies than were control-group teachers (Putnam, Lampert, & Peterson, 1990).

Although most of the classrooms in which CGI was tested were predominantly White, the researchers conducted a number of studies in urban classrooms serving predominately African-American children from lower socioeconomic groups. Just as had occurred in the predominately White classrooms, teachers in the urban schools redefined their mathematics curriculum and changed the way they thought about mathematics instruction as well as their instructional strategies. During the first year of implementation, children were successfully solving many problems that were not typical of a first-grade curriculum and could articulate their problem-solving strategies (Carey et al., 1995).

Curriculum reform. Recent efforts to revise the curriculum offered in urban schools have been focused on making the curriculum more engaging and relevant to students. In line with the culturally responsive pedagogical approach, curriculum reform efforts attempt to develop content that is multicultural and that relates to the students' current interests and life experiences.

Multiculturalism. Proponents of a multicultural curriculum argue for the inclusion of more diverse images, historical role models, and, in general, a more balanced view of academic subjects that represents the experiences and perspectives of marginalized groups (Banks, 1994). This position has been the subject of much debate in recent years, culminating in the highly controversial "curriculum of inclusion" adopted by New York State in 1991.

Real-world learning. A number of curriculum projects have been developed to focus on real-life experiences in the learning content (ED, OERI, 1993). Additionally, and on a national level, groups have undertaken to completely restructure the curriculum to enhance active student learning of higher order competencies through real-world applications in major subjects such as mathematics and science (National Council of Teachers of Mathematics [NCTM], 1989; Anderson, Pruitt, & Courtney, 1989; National Research Council [NRC], 1996).

Issues of curriculum reform in science and mathematics. Focusing instructional activities on societal issues and concerns that affect students' daily lives has been cited as one approach to revising the science and mathematics curricula. Another approach involves focusing the curriculum on the development of higher-order thinking skills and problem-solving abilities. It has been pointed out, however, that these two approaches are not mutually exclusive (Southwest Educational Development Laboratory [SEDL], 1994). Although there have no suggestions for explicit criteria for a culture-fair curriculum, organizations such as the National Center for Improving Science Education (NCISE) have suggested characteristics of a curriculum designed to appeal especially to at-risk students (NCISE, 1989). These include studying the students' immediate environment to help relate instruction to their daily lives; use of biography and history to demonstrate that science is not the exclusive property of White males; use of out-of-school resources such as hospitals, zoos, and museums; use of cooperative learning techniques; and use of instruction based on experience and inquiry as well as multicultural views of the natural world.

Science reformers have advocated a less-is-more approach to the science curriculum (National Science Teachers Association, 1992; NCISE, 1989). These advocates believe that such an approach allows students to develop a deeper understanding of science and mathematics and gives students time to test their ideas against those of their peers and to accumulate evidence to support their emerging understanding. Outcomes of this approach are the elimination of the memorization of facts and a more thorough understanding of concepts. Advocates are quick to point out the difference between focusing on fewer topics in a more meaningful way and the "dumbing down" curriculum that is often provided for students in lower instructional tracks (SEDL, 1994).

Instructional reform. In addition to revising the curriculum to engage disadvantaged students, traditional forms of instruction are being changed to reflect a more active arrangement of learning activities. Specific strategies include the use of constructivist approaches in instruction, involvement of nontraditional instructors such as mentors and race-sex role models, adult and cross-grade tutoring, peer support groups, cooperative learning, inquiry learning and activity-based instruction, tutoring, and integration of technology as a tool for instruction (ED, OERI, 1993).

Constructivism. Researchers in the cognitive tradition hold one of two very different views of the learner: passive recipient of information or active constructor of knowledge (Champagne & Hornig, 1987). The constructivist approach to teaching considers learning to be an active rather than a passive process. Since this view of teaching and learning holds that children come to school with knowledge, experience, and ideas, teachers are expected to assist them in building from these ideas in meaningful ways to promote learning. The role of the teacher thus becomes one of facilitator of experiential learning rather than transmitter of knowledge (SEDL, 1994).

The constructivist approach to teaching, while consistent with that of culturally responsive teaching is at odds with the two traditional assumptions of science or mathematics instruction: 1) Children know little or nothing about science or mathematics instruction when they come to school and the teacher's job is to cover as much as possible through classroom lecture and extensive reading; and 2) Each student learns best in solitude, isolated from the ideas and perceptions of others.

In constructivist classrooms, the teacher can supply students with a neutral zone in which to share with classmates their own constructs of the natural world and to test their shared knowledge against the perceptions of others. Such a classroom is interactional and social rather than structured and hierarchical (SEDL, 1994). Students build not only their own knowledge, but also a shared understanding among class members. While reading and lecturing may still remain as instructional techniques, more interactive approaches are also used. Many reformers believe that the valuing of individual differences inherent in this approach makes it more beneficial to female, poor, and minority students (Means & Knapp, 1991).

Mentoring. Mentoring is an approach that involves a one-to-one relationship between an adult volunteer and a student who needs support for the purpose of attaining academic or personal achievement gains. Advocacy, which is a variation of mentoring, is defined as a continuing set of relationships between an adult and members of a group of students (McPartland & Nettles, 1991). Research indicates that using outside adults as mentors or advocates can have small positive effects on a limited range of student outcomes, such as more positive attitudes toward school and good attendance (ED, OERI, 1994).

A frequent strategy that utilizes staff in a mentor or advisor role involves offering a homeroom-advisory period several times a week to discuss a variety of topics in a group setting. Occasionally, time is allocated for individual adult-student conferences. A few case studies have suggested that this approach may be a key to creating positive climates in middle or high schools (Lightfoot, 1983; Lipsitz, 1984; Maeroff, 1990).

Race-sex role models. Problems experienced by young African-American males in U.S. society have prompted the development of several approaches to providing more positive role models for these young men (Ascher, 1991). Some of the approaches involve placing African-American male classroom teachers in elementary grade classrooms for African-American male students, implementing mentoring programs with African-American male adults from the community, and peer tutoring approaches with older students helping young students of the same race and sex (ED, OERI, 1994). Although these efforts have been widely reported, no careful research has been conducted to assess their impact on students.

Despite the fact that evaluation has been lacking, there is reason to believe that exposure to positive race-sex role models may be important to school-aged African-American males (Fordham & Ogbu, 1986). Such programs, however, have been the subject of controversy on the grounds that they purposely segregate students by race and/or sex. Females (both African-American and of all racial/ethnic groups) and Hispanic youth of both sexes have been the subject of similar projects (Alvarez-Pease & Hakuta, 1992; American Association of University Women Education Foundation [AAUW], 1992; Butler, 1987).

The use of mentors and role models in mathematics and science intervention programs has been a longstanding practice (Clewell et al., 1992a). Social learning, developmental, and instructional theories view role models as an important vehicle for learning. Research studies have reported a positive association between role models and students' attitudes and career choices vis-a-vis science fields (Armstrong, 1980; Fennema & Sherman, 1978; Smith & Erb, 1986; Thomas, 1986). Mentoring has also been found to be highly effective in providing the encouragement and support needed for students to persist in science or mathematics study (Clewell et al., 1992a). Evans (1992) conducted a computer search and found not one study that measured the effect of racial or cultural role models on student achievement. In assessing the race and gender role-model effects in a high school economics course, he found no evidence of a gender role-model effect but found that classroom role models increased the achievement of African-American students by nearly 19 percent if their mothers did not have a college education.

Peer support. Several approaches have been developed to provide positive role models in schools and to encourage peer support for academic efforts. One strategy is to pair each student making the transition between elementary and middle school with an older student at the school in a peer-mentor relationship. Evaluations are not yet available to assess the effectiveness of this strategy.

Cooperative learning. In its broadest sense, cooperative learning is both an instructional grouping practice and a form of school organization (Stevens & Slavin, 1995). At the classroom level, it generally involves grouping students in small mixed-ability groups of study; at the school level, it involves reorganizing school practices (e.g., teacher collaboration in instructional and administrative planning, and parent involvement).[12] Thus, cooperative learning was not designed as a new technique to be applied in a traditional setting, but as an entirely new way of teaching and learning. As applied by schools, however, the extent to which it modifies school/classroom practices and organization varies, ranging from the occasional use of cooperative learning in classrooms as an instructional technique to the full transformation of a school following this model. There are also different cooperative learning models, e.g., Cooperative Integrated Reading and Composition (Stevens, Madden, Slavin, & Farnish, 1987), Team Assisted Individualization--Mathematics (Slavin & Karweit, 1985; Slavin, Madden, & Leavey, 1984)[13], and MathWings (Slavin, Madden, Dolan, & Wasik, 1994).

Numerous research studies show that cooperative learning enhances student achievement (e.g., Slavin & Karweit, 1984; Slavin, Leavey, & Madden, 1984; Stevens, Madden, Slavin, & Farnish, 1987).[14] While these have been year-long studies, two- and three-year studies have shown similar results (Stevens & Slavin, 1995; Hertz-Lazarowitz, Ivory, & Calderon, 1993; respectively), indicating that these positive effects are not due to "novelty" (e.g., Bossert, 1989) and can be sustained over time (Stevens & Slavin, 1995). Similarly, several multiple-year studies of Success for All, which is an elementary school program that incorporates cooperative learning strategies, indicate that the program leads to "substantial positive effects on students' reading performance" (Stevens & Slavin, 1995, p. 324). Researchers have also found that cooperative learning positively affects student self-esteem, student relations, attitudes toward school, students' ability to collaborate with others, acceptance of mainstreamed handicapped students, etc. (Johnson & Johnson, 1989; Slavin, 1994; Stevens & Slavin, 1995).

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[12] Some cooperative learning initiatives, such as Team Assisted Individualization--Mathematics, utilize both heterogeneous and homogeneous groups of students in order to accommodate students of varying ability in the classroom (Slavin, 1990).

[13] According to Slavin (1990), these two methods (which use both homogeneous and heterogeneous within-class groups) have been found to be useful for middle schools moving from between-class ability grouping to heterogeneous classrooms. Similarly Slavin points out that, in the upper elementary grades, an effective alternative to between-class ability grouping in mathematics is within-class ability grouping (Slavin, 1987).

[14] (Stevens & Slavin, 1995, pp. 323-324.) Slavin (in press) identified four theoretical explanations for the achievement effects of cooperative learning: (1) the motivational perspective (which focuses on the goal/reward structures created for students); (2) the social cohesion perspective (which is based on how cohesive student groups are and how this affects students' desire to help each other learn; (3) the developmental perspective (which focuses on the interaction of children as a way of fostering learning and (4) the cognitive elaboration perspective (which is based on the notion that to learn students must engage in the "cognitive restructuring, or elaboration, of the material," (tutoring each other, etc.). Although there is supporting evidence for every one of these perspectives, none of them applies to all success cases. According to Slavin, the motivational perspective has the added advantage of not only producing positive achievement effects, but also fostering the types of activities identified in the other perspectives/theories as being conducive to learning (e.g., students assisting and teaching each other).

In contrast, there have been multiple-year studies that have found very small or no effects on achievement (Talmage, Pascarella, & Ford, 1984; Solomon, Watson, Schaps, Battistich, & Solomon, 1990; Stevens & Slavin, 1995). According to Stevens and Slavin (1995), these studies were based on cooperative learning efforts that lacked an essential component: group goals. Slavin (1990, 1995) found that successful cooperative learning initiatives are characterized by two components: group goals and individual accountability. Studies of cooperative learning programs that contained both of these components have consistently shown positive results in terms of enhanced student achievement and other factors (Slavin, 1990; Stevens & Slavin, 1995).

In discussing the use of cooperative learning in science and mathematics classrooms, Johnson and Johnson (1987) argue that structuring these classrooms to be predominantly cooperative rather than competitive or individualistic results in several positive outcomes. Other researchers have reported enhanced science achievement as a result of using cooperative learning strategies. The effectiveness of cooperative learning strategies in mathematics classes in the program, Success for All, is described in the section of this reporton special programs. In addition, Cohen and DeAvila (1983) also reported higher student achievement for a bilingual, mostly Hispanic group of students in a cooperative structure inquiry program, compared to control classes with a competitive structure.

Inquiry learning and activity-based instruction. Cognitive and developmental theories support inquiry learning (also called the discovery method) by emphasizing the importance of students' own activity in learning (Piaget, 1952; Gagne, 1977). There is also support in the literature for student exploration to assist students in developing their own ideas and to provide them with opportunities to test their assumptions (Clewell et al., 1992a; Gagne, 1977). In addition to Gagne, a number of theorists emphasize the importance of children's own actions and manipulation of objects in learning (Dewey [1916] 1986; Piaget, 1959). Manipulating objects allows children to examine phenomena at their own pace. Activity-based instruction also allows children the opportunity to repeat actions as needed in order to understand and assimilate new information (Clewell et al., 1992a).

While few research studies have examined the relationship of instructional approaches to the achievement of disadvantaged students in this context, there is evidence that middle school-aged African-American and Latino students experience positive effects from hands-on inquiry activities in science (Cohen & DeAvila, 1983). Activity-based science instruction in the classroom has also been shown to have positive results on science process skills but not on content skills of a group of African-American, Latino and White urban fourth to eighth graders (Reynolds, 1991).

Tutoring. One-on-one tutoring is an effective strategy for providing extra help to disadvantaged youth. Success for All, which is described in Section I of this report, has tutoring provided by certified teachers as one of the central features of the program.

Reviews of peer-tutoring studies that look at same-age and cross-age strategies show that peer tutoring contributes to the achievement of both tutees and tutors (Natriello et al., 1990). Cohen and colleagues (1982), who conducted a meta-analysis of 65 studies, concluded that peer tutoring has modest positive effects on both tutors' and tutees' attitudes toward the subject of the tutoring and their own performance in those subject areas. This effect was more evident in programs that were highly structured. Researchers seem to agree that students receiving tutoring learn from their peers, and that students providing the tutorials learn from teaching other students (Gartner, Kohler, & Riessman, 1971).

Technology. Technology continues to be viewed as a catalyst for change in schools. It has been identified as a key component of the nation's education reform agenda (ED, OERI, 1993). A number of practitioners assert that information-age technologies are particularly promising for educating students at-risk. Several ways in which technology can help teachers meet the challenge of educating disadvantaged students were described in a special issue of *Electronic Learning* (1988). Few studies, however, have examined the actual effects of technology on learning outcomes for students at-risk. Data from a national survey reveal that the most frequently reported effects of computer use on this group are in behavioral and attitudinal areas including motivation, self-confidence, and self-discipline (Becker, 1986).

There is some evidence that technology can be effective in improving academic achievement of disadvantaged students as well as all other students. Technology is expensive, however, and schools with few resources will be hard pressed to provide their students with equal access to learning environments that are rich in technology. Necessary components for using technology successful for an at-risk school population requires maintaining access to technology throughout a student's school career, integrating it so that it is available for all kinds of learning, and deploying uses of technology that move away from traditional teaching and learning methods (ED, OERI, 1993)

The use of technology in the instruction of mathematics and science seems promising for disadvantaged students. A study was conducted to determine the effectiveness of supplementary computer-assisted instruction materials on the algebra achievement and attitudes of low-achieving minority students in an urban high school. The findings of the study indicated that students in the experimental group receiving supplementary computer-assisted instruction had greater academic achievement than students in the control group (Mickens, 1991). Similarly, the results of a study of the use of computer adaptive testing as part of remedial high school mathematics instruction for at-risk urban high school students resulted in greater mathematics self-confidence for African-American female students and improved performance for all students (Signer, 1991).

Explicit in most of the reform documents is the goal that all students should have access to high-quality instruction and content in mathematics and science courses. There is also an implicit acknowledgment of the failure of traditional compensatory efforts to educate at-risk students. The language of mathematics and science reform contains references to learning as an "active process" (NRC, 1996, p. 2); recommends that students "establish connections between their current knowledge of science and the scientific knowledge found in many sources," (NRC, 1996, p. 2); and suggests that teachers "nurture a community of science learners," (NRC, 1996, p. 3). Similar terminology is used in the mathematics standards, echoing the more recent approaches to teaching and learning described above. The reformers seem to have done their homework. Considerable scepticism has been expressed, however, by equity advocates regarding the effectiveness of reform efforts to improve educational prospects for at-risk students (Apple, 1992, 1995; Robenstine, 1994; Tate, 1995). Whether or not mathematics and science reforms have the intended effect on at-risk students remains to be seen. What is certain, however, is that implementing educational reform for at-risk populations will require support, creativity, experience, and a knowledge of effective teaching and learning approaches for these populations.

Teacher Professional Development

Professional development has emerged as a key component of standards-based reform. The reform movement is promoting changes in the structure of curriculum, instruction, and assessment. If teachers are to implement these effectively, professional development must change as well (Little, 1993).

This section explores the evolution of professional development in the context of school reform. It first discusses the assumptions behind many of the current models of staff development and explore the reasons why professional development, especially as it relates to inclusion and equality, has had limited success. The section then turns to a discussion of current research on professional development strategies that have proven successful in the present climate of reform. Finally, the section examines alternative structures of professional development that support teachers in their restructured roles.

Traditional Professional Development

Historically, there have been two views of professional development: the prevalent view of teachers-as-empty-vessels, in which "experts" transmit knowledge to teachers through seminars and other passive activities; and teacher-as-reflective-inquirer, in which teachers are actively involved in the learning process (Lieberman 1990 in Asayesh, 1993). Researchers have identified and criticized several underlying assumptions that support the view of teacher-as-empty-vessel and the types of professional development programs this view fosters. Summarizing the faulty assumptions, Fine (1994) writes that professional development has been conceptualized as short-term, discrete sessions that remediate or improve the performance of individual teachers. It has been assumed that occasional days during the school year provide the necessary time for teachers to be introduced to and learn new teaching ideas, and that the best way to teach those new ideas is through lectures and workshops. It has also been assumed that inservice training is a luxury that is best conducted at the district level. In addition, it has been assumed that teachers are the only professionals in schools who need to improve their performance and that they automatically transfer knowledge gained in staff development sessions to the classroom (Wood & Thompson, 1993).

The professional development programs in most schools today reflect these assumptions. A survey of the 5900 members of the National Staff Development Council (NSCD) indicated that they worked almost exclusively with teachers and that staff development programs trained teachers primarily in instructional strategies and classroom management (Davidson, Hinkelman, & Stasinosky, 1993). The most frequently used instructional methods included workshops, meetings, cooperative learning, videotapes, seminars, and lectures. The prevalence of top-down, passive, teaching strategies indicates that, like the assumptions on which they are based, most staff development sessions operate in a skills-driven paradigm based on knowledge consumption.

Because the student population is becoming increasingly diverse, many professional development programs concentrate on helping teachers to create environments in which all students can be successful. Like other forms of staff development, these programs have met with little success (Sleeter, 1992). For example, in a study designed to test the effectiveness of professional development programs geared toward helping teachers work more successfully with limited English proficient (LEP) students, teachers who had received multicultural training (via traditional professional development methodologies) were unable to assess student understanding accurately and often underestimated student performance abilities (Rhine, 1995). Similarly, Solomon (1995), in a study exploring educators' perspectives on multicultural and antiracist education policy and practice, found that teachers preferred multicultural education that would help them to manage diversity in their classrooms and were interested in topics such as cooperative learning and conflict management; they were resistant to inservice education that examined societal inequalities related to race, class, and gender and that encouraged them to explore and perhaps alter their own personal biases. This research indicates that traditional professional development techniques may not engage teachers in the types of introspective and reflective activities that are required to alter teacher attitudes and practices (Rhine, 1995; Solomon, 1995).

The demographic characteristics of professional staff developers in education suggest they may not be particularly well-attuned to issues in urban education. Based on an 18 percent response rate, the NSDC found that the typical member is a "white, mid-career, female who [works in] a suburban public school with about 5,000 students" (Davidson, Hinkelman, & Stasinosky, 1993, p. 62). Sixty-one percent of the respondents were female and 39 percent were male. Ninety-four percent were White. Twenty-five percent of the respondents reported working in urban schools, where there are significant percentages of minority students and teachers. Only 6 percent of the staff developers, however, were from minority backgrounds.

Sleeter (1992) found that even when teachers were interested in changing their practices, they were constrained by organizational structures such as time, class size, required curricula, poor relationships between families and schools, and the structure of special programs in the schools. This research highlights the inability of professional development to drive reform. Instead, Sleeter indicates that professional development should be geared toward helping teachers learn how to work in structures that have already been (or are being) reformed.

New Approaches to Professional Development

Current reforms are challenging teachers to be reflective and flexible practitioners, reformers, and decisionmakers (Bennett, 1995). Traditional forms of professional development offer little help to teachers in assuming these new roles. There is a clear misfit between the dominant training paradigm, which emphasizes knowledge consumption and new learning paradigms which emphasize knowledge production based on inquiry and problem-solving (Little, 1993). Wood and Thompson (1993) have summarized research findings that should guide professional development toward the knowledge production paradigms necessary for successful teaching and learning in this latest era of reform. Important findings are listed:

> *1. The largest unit one can change in education is the school; consequently it, and not the district, should be the primary focus of staff development (Berman & McLaughlin, 1978; Goodlad, 1984; Wood, 1989).*
>
> *2. Significant change in educational practice takes considerable time (four to five years) and is the result of staff development that is conducted over several years (Caldwell, 1989; Crandall, 1983; Wood, Thompson, & Russell, 1981).*
>
> *3. Successful professional development requires a school culture that is supportive of: a.) professional growth (Deal & Kennedy, 1982; Sapheir & King, 1985; Sizer, 1984); b.) career-long learning on the part of all staff (Caldwell, 1989; Joyce & Peek, 1977); c.) individual and collective commitment to and ownership of new programs and practices (Goin, 1991; Sly, 1992).*
>
> *4. The principal is key in any staff development effort to improve professional practice because he or she is the gatekeeper of school reform (Glickman, 1991; Wood, Caldwell, & Thompson, 1987).*
>
> *5. Selection of improvement goals that guide staff development should involve those who have a stake in the future of the students in the school (e.g. teachers, administrators, parents, community leaders, school staff and the students themselves) (Goin, 1991; Sly, 1992; Wood, 1989; Wood et al., 1981).*
>
> *6. Staff development should enable school personnel to improve professional practice in ways that increase student learning (Caldwell,1989; Sly, 1992; Wood,*

1989; Wood et al., 1981) and promote individual professional growth (Ellis, 1989; Krupp, 1989; Wood, 1984).

7. Knowledge about adult learners should serve as the basis for planning and implementation of staff development. This knowledge indicates that the material to be learned should have "real world" applications, that it should be relevant to personal and professional needs, and that it should be taught in a supportive environment. Research indicates that adults learn best when they receive feedback, when they are in small groups in which they can synthesize what they learn, when their prior knowledge is recognized, and when they have some control over what they are learning. Finally, because adults do not automatically transfer knowledge, they need coaching and other types of support to successfully convert knowledge into practice (Bem, 1972; Goin, 1991; Johnson & Johnson, 1980; Joyce & Showers, 1980, 1983; Sly, 1992; Wood, 1989).

Professional development programs that embody these new assumptions are usually collaborative in nature and are successful only when accompanied by organizational change (Little, 1993). This new conception of professional development encourages teachers to work in job-embedded inservice activities, such as action research, peer coaching, curriculum development, reflective teaching, and case discussions. Through these activities, teachers are encouraged to become members of professional learning communities. In such communities, they are more likely to attempt and perfect teaching practices in line with current research and reforms (McLaughlin & Talbert, 1993).

Fine (1994) suggests that organizational change around the structuring of time is essential if new forms of professional development are to emerge. Watts and Castle (1993 in Fine, 1994) have identified several ways in which schools can restructure teachers' time and provide opportunities for staff development. They include: 1) freed-up time, which clears teachers' time by providing volunteers and substitutes to take care of class; 2) purchased time, in which teachers are paid for extra time or others are paid to cover their classes out of specially earmarked funds; 3) common time, in which there are common preparation periods for teachers across grades, subjects, or projects; 4) restructured or rescheduled time, which is the formal alteration of the traditional school calendar; and 5) better used time, which involves freeing teachers from duties not directly related to teaching and planning.

Because teachers are expected to move beyond instruction to investigate, experiment, and design solutions to school problems using broad reform-based principles, Little (1993) suggests that expanded forms of teacher development that engage teachers in real problem solving which last over extended periods of time and have longlasting effects may be more appropriate forms of professional development for today's challenges. These alternative forms of staff development include: a) collaborations, such as the Urban Math Collaborations in which 15 major cities work with professional mathematicians to improve math teaching; b) subject matter associations such as the NCTE, NSTA, and the NCTM, which give teachers voice and leadership opportunities; c) collaborations targeted at school reform, like the Coalition of Essential Schools; and d) special institutions like the University of California's Lawrence Livermore Hall of Science, which is dedicated to making science and math more accessible to students, teachers, and parents and UC Berkeley's Bay Area Teacher Project, which is a writing program that helps teachers expand their understanding of language arts teaching (Little, 1993). Several of the general education reform efforts, as well as reform initiatives in mathematics and science education described elsewhere in this report, call for extensive professional development activities.

An additional alternative form of professional development occurs at the national level. Recognizing the need to change the nature of professional development to meet the challenges of current reforms, especially the standards established in *Goals: 2000*, the federal government has (re)funded a teacher professional development program which is strongly based on "best practice" research literature. The Eisenhower Federal Activities program, funded under Title II, part A, of the IASA, supports projects such as the Eisenhower National Clearinghouse for Mathematics and Science, and the National Teacher Training Project, both designed to provide teachers with state-of-the-art teaching strategies and materials (U.S. Department of Education [ED], 1995).

In addition, the Eisenhower Professional Development Program awards grants to districts and schools for professional development activities. The program is designed to support "sustained, intensive, high quality professional development activities tied to high academic standards" (ED, 1995, p. 3). It awards grants to the nation's elementary and secondary schools (and also to non-profits and institutions of higher education) based on formulas designed to ensure the inclusion of racial, ethnic, and language minorities and economically disadvantaged students. The grants are distributed to schools and school districts that submit a detailed plan which includes a needs assessment, a description of the staff development activities and their connection to standards, performance indicators to be used for evaluative purposes, and funding sources for the local agency's matching funds (33%). The plan must also include strategies to encourage greater participation of traditionally underrepresented groups. Eighty percent of the Eisenhower money must be spent on school-level activities (ED, 1995).

An example of a successful Eisenhower program is the Collaborative Model of Science Leadership Training Project, a collective of three school districts and a local university (in South Carolina) dedicated to improving science education for special education students in the region (Janas & Gurganus, 1993). The teachers in the collaborative assessed the state of science education for special education students in their districts, using interviews and surveys of teachers, students, and administrators. Based on the information gathered, they field tested teaching strategies and wrote an instruction manual that included the most successful ways to teach topics that the students indicated they wanted to study. The teachers then demonstrated the strategies to other teachers and provided them with peer support while they learned the techniques. Local, engaging, problem-based, and collaborative, this project is an exemplar of the type of professional development that will enable teachers to help students meet the high academic standards necessary for success in the 21st century.

Governance, Organization, and Management

In this section, we review research on issues of governance, organization, and management of urban schools and school districts and their role in promoting and sustaining instructional reform. These issues are critical. Between 1990 and 1995, for the first time in the twentieth century, spending on education failed to rise (Odden & Clune, 1995). In addition, education resources are likely to face serious competition for funds as states assume greater responsibility for health, welfare, and corrections. At the same time, there is increased pressure for higher student performance. In short, education must be managed more effectively than in the past if it is to yield higher results with flat or reduced resources.

Decentralization is at the center of organizational reforms in education in the nineties (Hannaway & Carnoy, 1993). Private school choice (Chubb & Moe, 1988), charter schools (Nathan, 1995; Wohlstetter, 1994), school-based management (*Education and Urban Society*, 1994; Summers & Johnson, in press), and contracting (Hill, 1994) are manifestations of this trend. In different ways, each of these reforms provide greater discretion at the school level and greater, or at least different, forms of accountability. The common presumption is that, freed from central regulation and faced with accountability, schools will develop more effective and efficient ways to promote student learning. With the possible exception of charter schools, urban settings have been the most common locus of these reforms, perhaps because urban districts face severe educational problems and carry out their work in a contentious public environment. Reform in management is a simple solution to a complex problem. History shows that "(w)hen Americans grow dissatisfied with public schools, they tend to blame the way they are governed" (Tyack, 1993). The high turnover rates among urban superintendents supports this view. The Council of Great City Schools (1992), for example, recently reported that when it surveyed its superintendents in 1992, 36 of the 47 superintendents reported being in their position for two years or less. Governance reforms in education are still at a fairly early stage and research has yielded only partial results, most of which are mixed.

Research on the effects of decentralization reforms on student achievement is meager (Summers & Johnson, in press). But research on some of the intermediate effects of decentralized management provide some insights because a long chain of connections must be realized in order to affect student achievement. (For a full discussion, see Hannaway, in press.) For example, decentralization proponents presume that locating decisionmaking authority at the school level will influence decisions by involving actors with different interests or different types and levels of information. As a consequence, different and presumably better decisions are expected to flow from the process. Case studies of decentralization efforts, however, question this effect. Malen and Ogawa (1988), for example, found that even when local school councils were given considerable authority, teachers and parents exercised little influence on significant decisionmaking areas. Weiss and Cambone (1994) found that while school-based management opened up opportunities for teacher involvement in decisionmaking, relatively few teachers became engaged. Similarly, Easton and Storey (1994) examined rates of participation in the Local School Councils which were established as part of the *Chicago School Reform Act of 1988*, and found relatively high rates of participation for principals, but relatively low rates for teachers and parents. Over time, teachers tended to become more involved, but their focus on instructional matters was weak.

Other research suggests that teachers themselves are an unlikely source of reform. In a recent survey in Chicago, teachers claimed that change on their part was unnecessary for school performance to improve; they felt they were already performing well in the classroom and it was the students who needed to change (Hess, 1993). Similarly, a study by Carol Weiss (1993) found little difference in the types of decisions reported in schools where teachers had considerable decision influence and schools where they did not. Indeed, there is some indication that the involvement of teachers in management may actually divert teacher time from teaching and learning concerns (Hannaway, 1993; Weiss & Cambone, 1994).

Decentralization efforts also presume that the skills and knowledge necessary to improve student performance already exists at the school level and need only to be released. Studies of decentralization efforts suggest this assumption is faulty and a risky one to make. Preliminary reports from the Chicago reform, for example, suggest Local School Councils focus much of their efforts on non-instructional areas (e.g., discipline and facilities). Less than a quarter of schools in the reform have developed plans likely to have any significant effect on instruction (Hess, 1993). In short, the literature suggests that schools left to their own devices are unlikely to direct efforts to a much greater extent than they already do to matters of teaching and learning.

Local accountability is another critical ingredient for effective decentralization. We know, however, from both survey and ethnographic studies that some schools, specifically higher socioeconomic status (SES) suburban schools, function with higher levels of parental monitoring and control even though it is not explicitly encouraged nor formally constituted; lower SES parents demonstrate lower levels of formal participation (e.g., Lareau, 1987, 1989; Stevenson & Baker, 1987). Higher SES parents, for example, are more likely to feel that getting involved in core academic issues is both their right and their responsibility (Lareau, 1987, 1989). Higher levels of education, confidence, knowledge, and status facilitate their involvement. Recent national survey results show that only 7 percent of parents with less than a high school education report high levels of involvement in school matters, while 42 percent of parents with at least a college degree were highly involved (Zill & Nord, 1994). Given these patterns, there is a real possibility that, to the extent that parental control ensures quality, decentralization may increase school quality disparities among schools serving students from different SES backgrounds (Hannaway, 1995).

While research estimating effects of governance changes on students' performance is sparse, results from research that has examined behavioral effects suggests that without some direct infusion of assistance and direction in the area of teaching and learning, decentralization is unlikely to yield much improvement in student performance on its own (Hannaway, in press;

Elmore, 1995). A similar story is emerging in research on restructuring, where schools make ambitious structural changes, for example, in relationships among teachers, student grouping, or scheduling. Changes in how teachers teach do not seem to flow, in any reliable sense, from structural changes (Hannaway, in press; Elmore, 1995; Elmore, Peterson, & McCarthy, 1995; Marks & Seashore-Lewis, 1995; Newmann, Marks, & Gamoran, 1995). One clear implication of these findings is that "reforms... focus first on changing norms, knowledge, and skills at the individual and organizational level *before* the focus on changing structure" (Elmore, 1995, p. 26).

Family Involvement

This section reviews studies relating to family involvement in student learning. The involvement and participation of family members in the education of children is a valued resource that can contribute to the success of school reform efforts. Barriers to participation, as well as effective strategies to involve parents and other family members of students from low-income and minority backgrounds, are explored.

Research has shown conclusively that family involvement increases student academic achievement among students from low-income and minority backgrounds (Coleman, 1987; Epstein, 1991; Henderson, 1987; Walberg, 1984). Researchers found that when families work to strengthen the home learning environment through reading, helping with homework (Clark, 1993), purposeful conversation (Ritter, Mont-Reynaud, & Dornbush, 1993), sustained interest in academic development, and other activities (Epstein, 1991), students perform better in school. Walberg (1984), in an analysis of 29 studies, found that family involvement is more predictive of academic achievement than socioeconomic status. In addition, parental involvement has been shown to be beneficial for disadvantaged students at the preschool level (Henderson, 1987). Consequently, family involvement has become an important aspect of many reform efforts, especially in urban schools.

Some research, including studies cited in the previous section on school governance, organization, and management, indicates that low-income parents are not as involved with their children's education as are their middle-class counterparts (Lareau,1989). Similarly, national surveys seem to indicate that poorly educated parents are less involved with their children's education than more highly educated parents (Chavkin, 1993). Further research indicates that barriers may exist that prevent low-income and minority parents from becoming involved in activities sponsored by their children's schools. Moles (1993) identified factors that combine to limit participation of low-income and minority parents in school-sponsored activities: knowledge on the part of both parents and schools of how to build collaborative relationships; restricted opportunities for interaction due to scheduling conflicts and other logistical difficulties; psychological and cultural barriers stemming from negative childhood school experiences; limited educational backgrounds of parents; linguistic differences; and differences in cultural orientations toward schools.

Calabrese (1990), in his survey of parents in an urban school district, found that minority parents believed that school personnel, including predominantly White teachers, related to them in a negative and critical fashion. Parents indicated that they only received negative messages from teachers and that their interaction with the school was usually confrontational and marked by hostility and unfriendliness. From this perspective, parents who may want to participate in a positive way are consciously and subconsciously alienated from teachers and the school.

Polls and an emerging body of literature, however, indicate that low-income and minority families are very interested in their children's education. Slaughter distinguishes between parental participation, which she defines as parents' engagement in school activities, and parental involvement, which she defines as parents' support of schooling (Slaughter, 1986 in Irvine, 1990). This distinction is important because while parents may not participate in school activities, they are supportive of their children's schooling; contrary to many stereotypes, they do care about their children's education and want to help (Garlington, 1991). Clark (1989 in Lewis, 1992) found that some very poor families create positive learning environments at home by setting aside time for learning, engaging their children in discussions, and taking their children to libraries and other educational settings. Similarly, a national poll indicated that disadvantaged parents want more contact with schools and desire to be contacted immediately when there is a problem. In addition, they want guidance in how to best support their children with schoolwork at home (Harris & Associates, 1987 in Chavkin, 1993).

An emerging notion is that to encourage and support increased family involvement, schools must take the initiative in fostering collaborative relationships with parents and other caregivers. In a study of urban parents, Epstein and Dauber (1991) found that teacher attitudes and behaviors play a key role in the level of parental involvement. Dauber and Epstein (1993) also found that levels of parental involvement are linked to school practices that encourage involvement. In addition, they found that these practices are more important than parent socioeconomic status in predicting parental participation. (Also, see the description of Comer's School Development Program, which includes parental involvement as an essential component, in an earlier section, "Special Programs for Disadvantaged Students.")

Epstein and Dauber (1991) have identified six types of parental involvement that can be a part of schools' comprehensive programs to encourage collaborations with families. They are as follows:

> *1. To help families meet their obligations to provide for their children's health, safety, and development, schools can provide workshops, home visits, support programs and information to help families gain better parenting skills and knowledge about their children's development.*
>
> *2. Schools can fulfill their basic obligation to clearly communicate with parents about school programs and student progress through memos, notices, phone calls, report cards, conferences, and/or through other creative means.*

3. Schools can improve schedules, recruitment, and training so that more families can participate as volunteers and be more helpful to teachers and students. Schools can also improve scheduling so that more families can participate as audiences for school performances.

4. Schools can encourage family participation in learning activities linked to schoolwork but completed at home by providing families with information on how to monitor , discuss, and help with homework, and how to make decisions about student participation in extracurricular activities.

5. Schools can support families in school decisionmaking, governance, and advocacy by training parent leaders and representatives in decisionmaking skills and ways to communicate with their constituencies.

6. An added component is that schools can support collaborations with community organizations that share an interest in children's futures by providing families with access to such community and support services and programs.

According to Epstein and Dauber (1991), by utilizing these interventions, all schools can develop comprehensive programs to increase levels of family involvement.

It is important to recognize that family involvement cannot solve all of the problems in urban schools, and that teachers and other school personnel often do not receive the necessary training to successfully interact with all parents. Nonetheless, because we know that academic achievement improves when the attitudes and expectations of home and school overlap (Epstein, 1987), parents should be considered a valued resource in educational reform efforts, and professional development activities should engage teachers in strategies designed to tap that resource.

School-Business Partnerships

In the context of urban education, school-business partnerships are frequently mentioned as an important element of the reform process. Particularly in the areas of math and science education, collaborative efforts between schools and private business hold the potential for making learning more relevant to the lives of students and for improving job skills in the labor market pool of employable graduates in the communities where these partnerships occur. Since the early 1980s, business has been a particularly vocal and powerful advocate for education reforms that promote the skills of U.S. workers in technological fields, and thereby improve the international competitiveness of U.S. industries (Atkin & Atkin, 1989; Committee for Economic Development [CED], 1985). Following this recent recognition of potential benefits to be acquired from cooperative endeavors between education and private industry, businesses have pursued various levels of involvement and commitment in their collaborations with schools. The range of roles that businesses play in public education may be classified generally into three categories: funding, program involvement, and policy involvement (CED, 1985).

Each of these three categories incorporates a substantial variation in possible commitment and participation levels. For instance, funding involvement may entail small-scale financing of a local scholarship fund, equipment donations for computer laboratories, or underwriting major educational research initiatives. Program involvement may include informal mentoring of at-risk students by community business leaders, sponsorship of career days or cooperative education programs, or even private management of career-oriented magnet schools (Dayton, Raby, Stern, & Weisberg, 1992). Similarly, policy involvement may translate into business managers seeking leadership positions on local school boards, or corporations undertaking support of national campaigns for educational policy reforms.

The possible benefits to be gained from collaboration between schools and businesses are compelling. Highly visible school-business alliances can serve as a powerful tool to foster increased public support for education, and may help to mobilize community action on educational issues. Furthermore, school partnerships with local businesses can fill significant gaps in urban school districts when a lack of financial resources, parental support, or positive role models threaten to jeopardize the success of at-risk students. However, collaborative efforts with private businesses cannot serve as a substitute for comprehensive educational reform, nor can partnerships compensate for insufficient public financing of urban school districts (CED, 1985).

While some scholars have sought to document cases of public-private partnerships that were deemed successful (e.g., Fosler & Berger, 1982), these studies largely fail to provide definitive criteria of success by which school-business partnerships can be measured. In an extensive review of the literature on public-private partnerships, Joy (1990) finds that this failure to provide clear criteria for defining and evaluating formal partnerships between public and private entities creates difficulty in attempting to generalize from particular case studies.

Critics of school-business partnerships point to their limitations in achieving the objectives of long-range systemic school reforms (Otterbourg, 1986). First, schools cannot rely indefinitely on corporations to maintain a sustained involvement over a long period of time (Atkin & Atkin, 1989). Additionally, collaborative efforts between schools and private business have the ability to serve only a limited number of students, particularly if employees of local businesses are volunteering their time and expertise. Finally, the outcomes of school-business partnerships may not be readily apparent or may be difficult to measure according to narrowly defined standards of success, such as improved test scores or grades (Blair, Brounstein, Hatry, & Morley, 1990).

Despite these limitations, however, school-business partnerships have the potential to produce benefits, both for urban school districts, and for the businesses that enter cooperative relationships with them (CED, 1985). Schools stand to gain both human and material resources, while businesses have the opportunity to help students develop relevant technical skills for future careers in math- and science-based industries (Blair et al., 1990).

SUMMARY AND CONCLUSIONS

This review has attempted to examine education reform-- especially mathematics and science education reform--from an urban perspective. We asked the questions: What chance does reform have of succeeding in urban schools? What conditions are likely to impede success? To enhance the success of reform efforts? In proceeding to answer these questions we looked to the research literature describing urban students, their characteristics, and academic performance. Next, we reviewed the resources available to support reform in urban schools: communities and families, the teaching force, financial resources, and special programs that supplement the work of schools. We then examined systemic reform efforts themselves and the implications of the standards-based reform movement for educational equity, identifying reform strategies of teaching and learning, professional development of teachers, governance, parental involvement, and school-business partnerships. Our findings from the literature are summarized below.

Education in the Urban Context

The great majority of urban students are racial and/or linguistic minorities; most of them are of low socioeconomic status. In other words, they fit the definition developed by Natriello and others (1990) of "disadvantaged" students. There are dramatic differences in academic achievement between these students and their more advantaged peers. In the last decade the gaps in performance among student groups decreased due to more rapid gains by the lowest achievers, but there is some evidence that these gains may be leveling off.

A look at some of the key resources that schools depend on to function tells us that urban school systems have fewer and poorer resources than their suburban counterparts.

Family and Community

Students in the largest urban school districts are more likely to come from families living below the poverty level, to have parents who speak a language other than English in the home, to be eligible for free and reduced lunch, and to face unemployment as youth. They live in cities where the crime rate far exceeds the national average, where there are higher infant mortality rates, where there is lower access to adequate health care, and where the AIDS rate is five times that of other types of communities. In short, the social, economic, and family background characteristics of urban students are such that urban schools must work harder and more efficiently than schools in other communities to properly educate their student populations.

Teachers

The urban teaching force is made up largely of White females who consider their jobs more stressful than teachers who work in other areas. The majority hold a bachelor's degree and almost all are certified in their main fields. Many, however, teach one or more classes in subjects for which they have neither training nor certification. This is especially the case in math and science. Urban teachers may see their students in terms of cultural stereotypes, which may, in turn, have a negative effect on their students' learning. Given the circumstances, it will be especially difficult for urban teachers to meet the higher standards of performance required by many reform efforts. High-quality, extensive professional development activities are necessary to support reform.

School Finance

Although research suggests that financial resources and expenditures may not be much lower in urban districts than those in other districts, when expenditures are adjusted for student need and cost, they are lower in urban districts. Special education costs are particularly burdensome. More research is needed in areas about which we know little: how resource allocation patterns differ between urban and other districts, how financial resources flow to the school level, and how different allocation patterns affect student performance. Most importantly, we need to know the extent to which different types of districts and schools are able to direct resources to assist students in meeting higher standards in core subject areas.

Special Programs for Disadvantaged Students

Programs designed specifically for educationally disadvantaged students, such as federal programs (e.g., Title I and Bilingual Education), non-governmental school-based reform networks, and mathematics and science intervention programs can be potentially valuable resources for systemic reform initiatives in urban school systems. Recent changes in some federal programs have made it easier to incorporate these programs into reform efforts; however, it still remains to be seen whether services from the various programs can be smoothly integrated into a comprehensive system providing high quality education for all students at the school level.

Special Education

Three critical issues emerge from the literature on special education and systemic reform. The first concerns the ability of teachers to simultaneously raise standards and adequately serve special education students in their classrooms. The second issue is related to the first: how can special education students be incorporated successfully into standards-based reform? A third concern is the ability of school districts to undertake costly reform efforts in special education while competing for scarce resources.

Systemic Reform in the Urban Context

The questions we sought to answer in this section included: What requirements and demands are being placed on urban school districts by standards-based systemic reform? What reform strategies seem particularly effective in increasing educational attainment of disadvantaged children, as called for by the standards?

Reform and Equity

Some of the strongest criticism of standards-based systemic reform concerns the potential implications for educational equity, especially for low-achieving students. The expectation of standards-based reform that all students can meet high standards presents a dilemma for urban schools, because it assumes that students must be held to the same educational standards regardless of individual characteristics or the characteristics of the schools they attend. To a larger extent, school accountability will be based on the assessment of student outcomes.

Even some of the most fervent supporters of standards-based reform have acknowledged that it is more likely that students from low-income families will have less access to the type of instruction that will result in favorable student outcomes. Standards-based reform, while holding great promise for equalizing learning opportunities and performance for all students, may achieve exactly the opposite. For without adequate supports and resources, the implementation of reforms in urban school systems will surely fail. Some of the tools that urban school systems can use to meet this challenge are discussed below.

Teaching and Learning Strategies

Teaching methods and strategies have emerged that represent a departure from the traditional approaches to teaching underachieving students. These recognize that children can learn challenging material while learning basic skills; emphasize pedagogical techniques that use students' prior knowledge, socio-cultural experiences, and strengths as stepping stones to further learning; view the classroom as a learning community; and view education as a socialization process rather than solely as instruction. This new vision of teaching and learning, because of its profound influence on the reform movements in mathematics and science, has had far-reaching implications for both curricular and instructional reform. Many of the standards in mathematics and science have been framed from the perspective of this new view. Implementing these strategies in urban schools, however, presents an additional challenge because many of these approaches, while effective in teaching disadvantaged students, require additional resources.

Professional Development

Teacher professional development has emerged as a very important aspect of reform. The standards-based systemic reform movement has required changes in curriculum, instruction, and assessment. If teachers, especially those in the urban teaching force, are to implement these reforms they must have access to continuous high-quality professional development opportunities.

Research has shown that existing professional development practices may not engage teachers in the types of introspective and reflective activities required to alter their attitudes and practices. Research has also pointed out the inability of professional development, as it is now structured, to drive reform. Instead, it has been suggested that professional development be geared toward helping teachers learn how to work within structures that have already been (or are being) reformed. A new concept of professional development has arisen that is collaborative in nature and that encourages teachers to work in job-embedded inservice activities, such as action research, peer coaching, curriculum development, reflective teaching, and case discussions, leading to their membership in professional learning communities. In such communities, it is believed, teachers are more likely to attempt and perfect teaching practices in line with current research and reforms.

School Governance, Organization, and Management

Issues of governance, organization, and management of urban schools and school districts have become critical. Between 1990 and 1995, for the first time in the twentieth century, spending on education failed to rise. Education resources face serious competition for funds as states assume greater responsibility for health, welfare and corrections. There is also increased pressure for higher student performance. All of these demands suggest that education must be managed more effectively than in the past if it is to yield higher results with constant or even reduced resources.

Research on the effects of governance changes and restructuring on student performance suggests that 1) without some direct infusion of assistance and direction in the area of teaching and learning, decentralization is unlikely to improve student performance on its own; and 2) structural changes do not seem to drive changes in how teachers teach. One clear implication of these findings is that reforms should focus first on changing knowledge and skills at the individual and organizational levels, before attempting to change structure.

Family Involvement

The involvement and participation of students' families is a valuable resource that can contribute to the success of school reform efforts because academic achievement improves when the attitudes and expectations of home and school overlap. Although low-income families tend to participate less than their better-educated, more affluent counterparts, there is evidence that low-income parents do care about and support their children's learning. Several barriers, however, have prevented low-income parents from participating in school-related activities. These barriers (e.g., few opportunities for interaction because of work commitments and other logistical difficulties, cultural barriers; limited educational backgrounds; linguistic differences; and others) can be overcome through strategies that have proven effective in improving parental involvement. While it is important to recognize that family involvement cannot solve all the problems in urban schools and that teachers and other school personnel often do not receive the necessary training to interact successfully with all parents, enlisting parental support for school reform will help to ensure the success of these efforts.

School-Business Partnerships

In the context of urban education reform, school-business partnerships are frequently mentioned as one alternative approach to assisting reform. Collaborative efforts between schools and business, particularly in the areas of mathematics and science education, have the potential for making learning more relevant to students' lives and for improving their job skills. While not sufficient to serve as a substitute for comprehensive educational reform or insufficient funding, collaborative efforts involving schools and business have great potential to benefit urban schools.

Conclusion

From our review of the literature we conclude that in implementing standards-based systemic reform, urban school systems face a far greater challenge than do other school systems. The expectation of standards-based reform that all children meet high standards poses a dilemma for urban schools. By defining equity as equality of student outcomes, the reform movement holds all school systems accountable for student performance. Urban school systems, however, with a majority enrollment of students from disadvantaged backgrounds and fewer resources with which to implement reform, are in a double bind. The social, economic, and family background characteristics of urban students are such that in order for them to achieve at high levels, the schools have to be better than those in other communities. Research on resources available to urban schools in the form of teachers, finances, and special programs indicates that these resources are less adequate in urban areas than those enjoyed by schools in other communities. In a nutshell, urban school systems have to accomplish more with less. What is the prognosis, then, for the success of education reform in these school districts?

In reviewing the literature on areas where reform strategies can be applied to the best advantage in urban schools, the implications are that the reform of teaching and learning practices holds the most promise for effecting reform. Research on restructuring and changes in school governance has found that changing knowledge and skills at the individual and organizational levels should be undertaken before focusing on structural change. Professional development can be seen as closely allied to the reform of teaching and learning practices, especially if it embraces the new concept of teacher professional development described in the literature. Both family involvement and school-business partnerships are areas that, while not sufficient in and of themselves to bring about reform, are nevertheless valuable sources of support for reform efforts.

Urban school districts must be creative in the use of resources to implement reform. These districts also require financial help, technical assistance, and the support of parents, communities, and businesses to assist them in maximizing their investment in standards-based systemic reform. Urban school districts engaged in implementing reform face incredible odds. To succeed would represent a triumph of will over reality. To fail would be unthinkable.

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APPENDIX

TABLES

TABLE 1: INCOME AND EMPLOYMENT STATISTICS FOR USI CITIES

City	Unemployment rate, 1991[1]		Income below poverty level		Median household income, 1991	Households receiving public assistance (Percent)
	by city	by state	% of all persons	% of children under 18		
Phoenix	5.0%	5.7%	14.2%	20.0%	$29,291	5.8%
Fresno	11.0%	7.5%	24.0%	36.6%	$24,923	19.6%
Los Angeles	9.0%	7.5%	18.9%	27.3%	$30,925	10.7%
Washington DC	7.7%	NA	16.9%	25%	$30,727	8.9%
Miami	10.7%	7.3%	31.2%	43.7%	$16,925	18.0%
Chicago	8.4%	7.1%	21.6%	33.6%	$26,301	14.4%
New Orleans	6.1%	7.1%	31.6%	46.2%	$18,477	14.8%
Baltimore	9.4%	5.9%	21.9%	32.2%	$24,045	16.4%
Detroit	13.1%	9.2%	32.4%	46.4%	$18,742	26.1%
New York	8.6%	7.2%	19.3%	29.9%	$29,823	13.1%
Cincinnati	5.9%	6.4%	24.3%	37.2%	$21,006	14.3%
Cleveland	8.5%	6.4%	28.7%	42.8%	$17,822	21.9%
Columbus	4.8%	6.4%	17.2%	24.0%	$26,651	9.4%
Philadelphia	8.0%	6.9%	20.3%	30.0%	$24,603	14.0%
Memphis	5.9%	6.6%	23.0%	34.7%	$22,674	11.8%
Dallas	6.9%	6.6%	18.0%	27.1%	$27,489	5.8%
El Paso	10.6%	6.6%	25.3%	34.3%	$23,460	9.7%
United States average	6.7%		13.1%	17.9%	$30,056	N/A

source: U.S. Bureau of the Census. *__County & City Data Book, 1994,__* *Washington, DC. 1994.*

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[1] Civilian unemployment rate as a percentage of total civilian labor force.

TABLE 2: SELECTED STATISTICS ON SOCIAL CONDITIONS IN USI CITIES

City	Foreign born population (Percent)	Non-English language in home (Percent)	Serious Crimes known to Police[1]		School Enrollment, 1990[2]		Educational Attainment, 1990[3]	
			Violent crime[4] rate	Total crime rate[5]	Elementary & high school (Total)	Attending public school (Percent)	High school grad.	BA degree or more
Phoenix	8.6%	18.7%	1,146	9,282	167,455	92.8%	78.7%	19.9%
Fresno	17.1%	33.1%	1,450	10,944	74,091	95.9%	69.0%	19.1%
Los Angeles	38.4%	49.9%	2,374	8,873	612,150	86.8%	67.0%	23.0%
Washington DC	9.7%	12.5%	2,922	11,755	80,160	83.9%	73.1%	33.3%
Miami	59.7%	73.3%	3,893	18,745	59,490	90.3%	47.6%	12.8%
Chicago	16.9%	29.1%	NA	NA	492,184	79.5%	66.0%	19.5%
New Orleans	4.2%	7.8%	2,039	10,735	95,293	79.7%	68.1%	22.4%
Baltimore	3.2%	6.5%	2,994	12,541	119,468	85.5%	60.7%	15.5%
Detroit	3.4%	7.5%	NA	NA	206,424	87.3%	62.1%	9.6%
New York	28.4%	41.0%	2,090	8,171	1,180,484	79.1%	68.3%	23.0%
Cincinnati	2.8%	5.4%	1,536	8,442	56,321	81.3%	69.6%	22.2%
Cleveland	4.1%	11.1%	1,643	7,910	88,769	78.7%	58.8%	8.1%
Columbus	3.7%	6.3%	1,105	8,706	91,754	88.4%	78.7%	24.6%
Philadelphia	6.6%	13.7%	1,255	6,262	253,760	70.8%	64.3%	15.2%
Memphis	1.4%	3.8%	1,634	10,041	107,032	89.3%	70.4%	17.5%
Dallas	12.5%	22.2%	1,743	10,627	164,072	90.2%	73.5%	27.1%
El Paso	23.4%	66.7%	1,102	8,429	121,224	94.6%	65.3%	16.2%
United States average	7.9%	13.8%	746	5,483	42,566,788	90.2%	75.2%	20.3%

source: U.S. Bureau of the Census. *County & City Data Book, 1994,* *Washington, DC. 1994.*

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[1] Crime statistics from: Statistical Abstract of the United States, 1995, U.S. Bureau of Census, 1995, pp.200-201.

[2] Total persons 3 years and older enrolled in school in 1990.

[3] Educational attainment of persons over 25 years old.

[4] Crimes classified as violent are non-negligent manslaugter, murder, aggravated assault, and forcible rape.

[5] Crime rates are defined per 100,00 resident population in 1993, estimated by FBI.

TABLE 3: SELECTED CHARACTERISTICS OF USI SCHOOL DISTRICTS, 1992-1993

City	School District	Expenditures Per Pupil	Minority Student Populations		Students Eligible for free lunch
			Hispanic	Black, non-Hispanic	
Phoenix	(Paradise Valley Unified Dst 69)[1]	N/A[2]	N/A	N/A	N/A
Fresno	Fresno Unified	$3.965	37.9%	10.2%	53.6%
Los Angeles	Los Angeles Unified	$5,286	65.1%	14.6%	68.5%
Washington DC	DC Public Schools	$7,435	5.6%	89.1%	56.9%
Miami	Dade County SD	$5,499	48.1%	33.9%	44.1%
Chicago	City of Chicago SD 29	$5,093	29.0%	56.2%	N/A
New Orleans	Orleans Parish School Board	$7.652	1.4%	89.3%	75.7%
Baltimore	Baltimore City PSS	$4.631	0.3%	82.3%	60.3%
Detroit	Detroit Public Schools	$5,547	2.4%	89.1%	68.2%
New York	NY City Public Schools	$6,784	35.7%	37.4%	N/A
Cincinnati	Cincinnati City SD	$5,336	0.2%	64.1%	51.0%
Cleveland	Cleveland City SD	$6,593	6.7%	69.5%	69.0%
Columbus	Columbus City SD	$4,955	0.6%	49.7%	50.8%
Philadelphia	Philadelphia City SD	$6,006	10.1%	62.8%	N/A
Memphis	Memphis City SD[3]	$3,644	0.2%	81.1%	N/A
Dallas	Dallas ISD	$4,131	38.2%	44.9%	68.8%
El Paso	El Paso ISD[4]	$4,062	73.7%	4.7%	60.6%

source: *Characteristics of the 100 Largest Public Elementary and Secondary School Districts in the United States: 1992-93.* *Statistical Analysis Report, National Center for Education Statistics. Washington, DC. October, 1995.*

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[1] Other school districts also serve the city of Phoenix. Only the largest of these is reported in this table.

[2] Data are not available for this school district in the NCES publication, because the largest Phoenix school district does not rank among the largest 100 school districts in the nation.

[3] Other school districts also serve the city of Memphis. Only the largest of these is reported in this table.

[4] Other school districts also serve the city of El Paso. Only the largest of these is reported in this table.

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TABLE 4: STATUS OF STANDARDS-BASED REFORM IN USI STATES

States	*CCSSO Report **				*AFT Rating ***	
	Content Standards	**Performance Standards**	**Assessment**[1]	**OTL Standards**	**Adequate**[2]	**Aligned**[3]
Arizona	Math & Science	None	NRT, CRT, Pr, Pf, WS	No	No	Yes
California	Math & Science	Math & Science	NRT, CRT, Pf, Pr, WS	No	Yes	Yes
DC	UD	—	—	---	No	Yes
Florida	UD	—	NRT, CRT, WS	No	—	No
Illinois	UD	Math & Science	NRT, CRT, WS	No	No	Yes
Louisiana	Math & Science	Math & Science	NRT, CRT, WS	No	No	Yes
Maryland	UD	Math & Science	Pr, WS	No	No	Yes
Michigan	Math & Science	Under Development	CRT	No	Yes	Yes
New York	UD	Math & Science	CRT, Pr, WS	Yes	No	Yes
Ohio	Math UD: Science	Math	NRT, CRT, WS	No	No	Yes
Pennsylvania	UD	Tied to Content Standards	CRT, Pr, WS	UD	No	No
Tennessee	Math & Science	Math	NRT, CRT, WS	No	Yes	Yes
Texas	Clarification UD	Under Development	NRT	—	Yes	Yes

UD: Under Development
---: Data not available

* *Status Report: State Systemic Education Improvements*, Council of Chief State School Officers, August 1995

** *Making Standards Matter: A Fifty-State Progress Report on Efforts to Raise Academic Standards*, The American Federation of Teachers, 1995

[1] Assessment Codes: CRT: Criterion-Referenced Test; NRT: Norm-Referenced Test; Pf: Portfolio Assessment; Pr: Performance Test, WS: Writing Sample

[2] Indicates whether or not the state standards were "clear and specific enough" to be "strong enough to carry the weight of the reforms being built upon them" (AFT, 1995, p. 13-14)

[3] Indicates whether or not the state assessments were aligned with the state content and performance standards.

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